

**CALIFORNIA INTEGRATED WASTE MANAGEMENT BOARD**

8800 Cal Center Drive  
Sacramento, California 95826



Wesley Chesbro, Chairman  
Jesse R. Huff, Member  
Kathy Neal, Member

Tuesday, December 7, 1993  
10:00 a.m.

Thursday, December 9, 1993  
10:00 a.m.

meeting of the

**LOCAL ASSISTANCE AND PLANNING COMMITTEE**

of the  
**CALIFORNIA INTEGRATED WASTE MANAGEMENT BOARD**

8800 Cal Center Drive  
Sacramento, CA 95826

**AGENDA**

Note: o Agenda items may be taken out of order.  
o If written comments are submitted, please provide 20  
two-sided copies.

**Important Notice:** The Board intends that Committee Meetings will constitute the time and place where the major discussion and deliberation of a listed matter will be initiated. After consideration by the Committee, matters requiring Board action will be placed on an upcoming Board Meeting Agenda. Discussion of matters on Board Meeting Agendas may be limited if the matters are placed on the Board's Consent Agenda by the Committee. Persons interested in commenting on an item being considered by a Board Committee or the full Board are advised to make comments at the Committee meeting where the matter is considered.

**THE FOLLOWING ITEMS WILL BE CONSIDERED ON TUESDAY, DECEMBER 7, 1993 AT 10:00 A.M.:**

1. CONSIDERATION OF STAFF RECOMMENDATIONS ON THE ADEQUACY OF THE CONTRA COSTA COUNTYWIDE INTEGRATED WASTE MANAGEMENT PLAN
2. CONSIDERATION OF PETITION FOR REDUCTION IN THE DIVERSION REQUIREMENTS FOR THE CITY OF BISHOP, INYO COUNTY AND THE UNINCORPORATED COUNTY OF INYO

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3. CONSIDERATION OF ADOPTION OF EMERGENCY REGULATIONS REGARDING CITY, COUNTY AND REGIONAL AGENCY SOURCE REDUCTION AND RECYCLING ELEMENTS AND NONDISPOSAL FACILITY ELEMENTS
4. CONSIDERATION OF STAFF RECOMMENDATIONS ON THE STATUS REPORT DOCUMENT FORMAT
5. CONSIDERATION OF STAFF RECOMMENDATIONS CONCERNING THE DEVELOPMENT OF GUIDELINES FOR SUBMITTAL OF DOCUMENTATION FOR BASELINE DIVERSION CREDIT FOR RESTRICTED WASTES
6. CONSIDERATION OF THE MODEL FOR PREPARING A NONDISPOSAL FACILITY ELEMENT
7. CONSIDERATION OF STAFF RECOMMENDATIONS AND PUBLIC COMMENTS ON THE WEIGHT/VOLUME CONVERSION FACTOR STUDY FOR IN-VEHICLE AND IN-PLACE WASTE DENSITIES

THE FOLLOWING ITEMS WILL BE CONSIDERED ON THURSDAY, DECEMBER 9, 1993 AT 10:00 A.M.:

8. CONSIDERATION OF USED OIL RECYCLING BLOCK GRANT PROGRAM FUNDING RECOMMENDATIONS FOR 1993/1994
9. CONSIDERATION OF APPLICATION PACKAGE FOR LOCAL GOVERNMENT USED OIL OPPORTUNITY GRANT PROGRAM (OPPORTUNITY GRANTS)
10. CONSIDERATION OF USE OF WASTE-DERIVED MATERIAL FOR ALTERNATIVE DAILY COVER (ADC) AS IT PERTAINS TO DIVERSION MANDATES AND WASTE MANAGEMENT PLANNING REGULATIONS
11. OPEN DISCUSSION
12. ADJOURNMENT

**Notice:** The Committee may hold a closed session to discuss the appointment or employment of public employees and litigation under authority of Government Code Sections 11126 (a) and (q), respectively.

For further information contact:  
INTEGRATED WASTE MANAGEMENT BOARD  
8800 Cal Center Drive  
Sacramento, CA 95826

Catherine Foreman  
(916) 255-2156

# California Integrated Waste Management Board

## LOCAL ASSISTANCE AND PLANNING COMMITTEE

December 7, 1993

### AGENDA ITEM #1

**ITEM:** Consideration of Staff Recommendations on the Adequacy of the Contra Costa Countywide Integrated Waste Management Plan

#### BACKGROUND:

Public Resources Code (PRC) 41780 requires every city and county to adopt and submit waste management plans to the Board for approval which detail how each jurisdiction plans to achieve the diversion mandates of 25 percent reduction of solid waste disposal by 1995 and 50 percent by year 2000 through source reduction, recycling, and composting activities. Specifically, each jurisdiction must draft and adopt a Source Reduction and Recycling Element (SRRE), a Household Hazardous Waste Element (HHWE), and a Non Disposal Facility Element (NDFE). In addition, the county must adopt a Countywide Siting Element and a Countywide Integrated Waste Management Plan, and a majority of the cities representing a majority of the population within the County, must also adopt these countywide documents. The locally adopted final SRREs, HHWEs, NDFEs, the Countywide Siting Element, and the Countywide Summary Plan are combined to become the Countywide Integrated Waste Management Plan (CIWMP). Contra Costa County is the first county in the State to submit their Final Countywide Integrated Waste Management Plan (CIWMP) to the Board for approval.

Contra Costa County submitted their preliminary draft CIWMP and Siting Element on September 18, 1992. Board staff made a presentation to the Planning Committee and Board in December of 1992 to discuss the County's progress in the planning process. At that time, the County was looking for assurances that, in the absence of permanent regulations, the Board would accept their final CIWMP for review, and that the review be based on statute and draft regulations available at the time the final CIWMP was drafted. In addition, the County had asked to be exempted from the requirements of PRC 41730, et seq. which would take effect in January of 1993 and require each jurisdiction to draft and adopt a Nondisposal Facility Element. The Board agreed to review the final CIWMP based on statute and final regulations existing as of January 1, 1993, thus requiring that the jurisdictions draft and adopt Nondisposal Facility Elements (NDFEs) required by the passage of AB 3001.

This Plan represents the first such Countywide Integrated Waste Management plan the Board has received to date. Statutory changes enacted by the adoption of AB 440 require that

jurisdictions submit final SRREs and NDFEs to the Board separately from the HHWEs, Siting Element and Summary Plan.

Contra Costa County has 18 incorporated cities within its boundaries. The County has evolved into distinct wastesheds which nearly correspond to existing planning regions. Within the County there are two sanitation districts: the Delta Diablo Sanitation District, representing Pittsburg, Antioch, and a portion of the unincorporated County; and the Central Contra Costa Sanitation District, representing Orinda, Moraga, Danville, and Lafayette. The cities of Walnut Creek and San Ramon entered into an agreement with the Central Contra Costa Sanitation District for the preparation of planning documents. In addition, there are several Joint Power Authorities (JPA's) in the County: The West Contra Costa JPA representing El Cerrito, Hercules, San Pablo, Pinole, Richmond, and a portion of the unincorporated County; The Central Contra Costa Waste Management Authority representing Orinda, Moraga, Danville, Lafayette, Walnut Creek, and San Ramon; and the Countywide Solid Waste Management Authority which all jurisdictions are members except Richmond and Pittsburg. The Countywide JPA is currently being re-structured to more clearly define the Countywide issues to be dealt with, and to delineate responsibility for implementing, monitoring, and reporting on Countywide programs.

The jurisdictions drafted and adopted NDFEs as they had previously done for their SRREs and HHWEs. After each jurisdiction approved the Siting Element and Summary Plan as required by PRC 41760, all adopted planning documents were forwarded to the County for inclusion in the CIWMP and delivered to the Board for review and approval or disapproval on August 25, 1993 at the Board meeting in Los Angeles. According to PRC 41800, the Board is required to review and determine the adequacy of a SRRE, HHWE, NDFE, or CIWMP within 120 days from the time it receives a final element. The Board must either approve or disapprove the element or plan (PRC 41800 (a), 41800(b), 41802). The approval or disapproval must occur at a public hearing. If the Board does not act to approve or disapprove a CIWMP submitted for review within 120 days, the CIWMP shall be deemed approved. The 120-day period for Board action on Contra Costa County's CIWMP expires December 25, 1993. Consequently, this item is being scheduled for the December 15, 1993, Board meeting.

When final planning documents are submitted to the Board for approval or disapproval, the submittal must include proof of notice of public hearings conducted to receive comment from the public as required by PRC 41793 and Title 14 of the California Code of Regulations (CCR) 18766; resolutions from the jurisdiction's governing body (City Council or Board of Supervisors) adopting the documents as required by PRC 41000 and

Title 14 CCR 18784; proof of compliance with the California Environmental Quality Act (CEQA), and comments from the Local Task Force (LTF) as required by Title 14 CCR section 18784. The Board has 30 days to determine the completeness of the submittal and notify jurisdictions if there is information missing. Not all the required documentation was submitted, and Board staff worked with jurisdictions in obtaining the necessary, and legally mandated, documentation. By mid-November all the required supporting documentation was submitted.

If the Board disapproves any jurisdiction's SRRE, NDFE, HHWE, Siting Element, or CIWMP, the Board must issue a Notice of Deficiency (NOD) to that jurisdiction as required by PRC 41810. The Board is required to notify the jurisdiction within 30 days of the its decision. A NOD for all element disapprovals would be issued to the applicable jurisdiction. The NOD must include specific deficiencies of the element and specific recommendations on how to correct the deficiencies. Within 120 days of receipt of the NOD, the jurisdiction must correct the deficiencies, readopt, and resubmit the document to the Board, pursuant to PRC 41811.

If an element submitted to the Board for final review includes a claim for the diversion of any excluded waste types specified in PRC 41781.2 (inerts, scrap metal, white goods, or agricultural waste) within their 1990 base year diversion claim, the Board must notify the jurisdiction pursuant to PRC 41801.5 within 60 days of the 120-day timeframe if we intend to exclude these waste types from their claim. The Board may adjust a jurisdiction's base year diversion claim if there is insufficient documentation to substantiate the claim. PRC Section 41781.2 (c) states that the four waste types may not be counted towards a jurisdiction's base year rate of diversion unless the jurisdiction demonstrates that all of the following criteria have been met for each excluded waste type claimed:

1. The material was diverted from a permitted disposal facility through an action by the jurisdiction which specifically resulted in the diversion.
2. Prior to January 1, 1990, the material was disposed of in the quantity being claimed as diverted.
3. The jurisdiction continues to implement source reduction, recycling, and composting programs as described in the SRRE.

If a jurisdiction receives a Notice of Deficiency due to excluded waste types in their base year diversion claim, the jurisdiction may submit additional information not included in their final SRRE to substantiate that the material was diverted from a

permitted solid waste facility, and which satisfies the criteria specified. The jurisdiction will have 60 days after Board action to submit the additional documentation. Upon receipt of additional information from the jurisdiction, the Board has 60 days to evaluate the new information and determine if it complies with the criteria specified in PRC 41781.2. If it is determined that the documentation is insufficient, and the element disapproved, the Board must issue a NOD. The NOD must detail the specific deficiencies and recommendations for revising the element to bring it into compliance.

Based upon the Board's determination, the jurisdiction has 120 days to correct the deficiencies, readopt, and resubmit the element to the Board. If the jurisdiction is unable to resubmit the SRRE within 120 days, the Board has the prerogative to extend the deadline pursuant to PRC 41811.5. If a jurisdiction's revised SRRE or CIWMP is still deemed inadequate by the Board, the Board must conduct a public hearing and take testimony on the element and deficiencies identified by the Board. After conducting the public hearing, the Board may consider imposing administrative civil penalties up to \$10,000 a day pursuant to PRC 41813.

#### **ANALYSIS:**

A comprehensive analysis of each jurisdiction's SRRE, HHWE, NDFE, and the Countywide documents can be found in Attachment 1. The following discussion is a summary of the expanded analysis.

Guided by the CIWMP enforcement criteria adopted at the Board's November 17, 1993 meeting, for determining element or plan adequacy, staff review consisted of comparing the final elements with staff comments on the drafts of these documents and comparing the final elements with the statutory and regulatory requirements for the elements.

#### **SRREs, HHWEs, AND NDFEs:**

All jurisdictions within this County had diversion programs in place prior to the passage of AB 939 in 1989. All have implemented additional diversion programs, or sponsored activities, in the three years since the passage of AB 939. Many of the jurisdictions actively promote backyard composting and other source reduction activities, and all jurisdictions offer residential curbside collection to their single-family residents, and commercial recycling programs. Paper recycling programs within government offices occurs in 13 of the jurisdictions with the remaining 6 jurisdictions planning to implement this program prior to 1995. Eleven of the jurisdictions already have a school recycling program in place. The jurisdictions have cooperated on

a mobile countywide household hazardous waste program, and many of the jurisdictions have local collection programs as well. The NDFEs indicate that at least five Material Recovery Facilities are proposed to assist jurisdictions with the implementation of their diversion programs. There is a commitment on the part of the jurisdictions to comply with the Act.

SITING ELEMENT:

On May 7, 1992, the Keller Canyon Landfill opened and began accepting waste for disposal, providing the County with 30 years of landfill capacity. Jurisdictions still have the option of using the Acme landfill or the West Contra Costa Sanitary Landfill for the next few years. Both landfills will begin closure activities within the next few years.

PLAN SUMMARY:

Major waste issues of a countywide nature have been identified, as well as goals and objectives set forth by the Local Task Force. In addition, on June 24, 1992, the Board designated the entire shoreline of Contra Costa County as a Recycling Market Development Zone. The Zone will assist in developing businesses engaged in re-use/remanufacture of recyclables. This is a countywide marketing development strategy.

STAFF COMMENTS:

Issues

Twelve of the nineteen jurisdictions in Contra Costa County have claimed diversion credit for excluded waste types within their 1990 base year diversion claim and did not include sufficient documentation for the claim. Each of the twelve jurisdictions were notified by letter of their adjusted baseline and adjusted projected diversion levels for 1995 and the year 2000. The result of adjusting the base year diversion claim by removing the unsubstantiated diversion numbers for excluded waste types resulted in five of the jurisdictions' 1995 projections falling short of the 25% diversion mandate. An additional two jurisdictions have adjusted projections for the year 2000 which fall short of the 50% mandate. Board staff met with representatives of all twelve jurisdictions on Friday, October 29, 1993. The meeting was to provide guidance on the types of documentation which would be appropriate to substantiate their claims, and to discuss the ramifications of a jurisdiction's inability to produce documentation. Board staff continued working with these representatives to produce adequate documentation prior to this Committee meeting. According to statute, jurisdictions wishing to provide additional documentation and have been issued NODs will have 60 days after Board action on December 15, 1993 to submit additional documentation. Then Board staff will have 60 days to review that

documentation and make a determination on its adequacy. For those jurisdictions whose base year and diversion projections were adjusted but do not receive NODs may revise their SRRE at any time to include the required documentation to substantiate their claim for excluded waste types. Jurisdictions need not revise their documents, or may choose to wait until the first revision of the SRRE to include documentation to substantiate the excluded waste types claimed.

Staff believe that there is a possibility that many jurisdictions within the County will not be able to achieve the 25% diversion goal by 1995 due to the lack of adequate composting facilities. While this is not an issue affecting the adequacy of the plans, it could be an issue with the implementation phase. Most jurisdictions have projected between 10 and 15% diversion credit for composting to reach the 1995 goal, and without facilities on-line there is real concern that most of the jurisdictions will be in jeopardy of not reaching the goal if regional composting facilities do not come on line within the next year. There are two permitted pilot composting projects within the County, neither of which has a site large enough to accommodate the regional needs. Any combination of the proposed facilities coming on line would alleviate this concern.

At least five material recovery facilities (MRFs) have been proposed within the County, all of which include plans for regional composting. They are: the Contra Costa Station for Materials Recovery and Transfer (SMRT) in Pittsburg; the East Contra Costa Community Collection Center in the unincorporated County and within the sphere of influence of the City of Antioch; the Martinez Transfer Station/Material Recovery and Compost Facility within the City of Martinez; the Acme Fill Waste Recovery and Transfer Station within the unincorporated area of the County; and the West County Integrated Resource Recovery Facility located in unincorporated County and within the sphere of influence of the City of Richmond. Most of the cities entered into Joint Powers Agreements (JPAs) or Memorandums of Understanding (MOUs) with sanitation districts and other cities within the County to site, build, and operate these facilities in order to fully implement their SRREs and HHWEs. There is an urgent need for one or more of these facilities to come on line prior to 1995 or many of the jurisdictions may be in danger of falling short of the mandated diversion goals.

Board staff recommends that the Board do whatever it can to assist with permit streamlining, and financing assistance. The Shoreline of the County has been designated a Market Development Zone and perhaps Board staff can assist with loan application development and other assistance deemed appropriate.

6.

Existing statute requires the Board to determine whether an element or plan complies with the pertinent provisions of the PRC, and to approve or disapprove based on that determination. If a document contains all the minimum requirements, and staff make a determination that the document is adequate, approval is recommended.

Board staff will provide detailed findings and recommendations closer to the Committee Meeting date.

Prepared by: Michelle Marlowe-Lawrence *MMJ* Phone: 255-2307

Reviewed by: Dianne Range *DR* Phone: 255-2304

Reviewed by: Lorraine Van Kekerix Phone: 255-2670

Reviewed by: Judith Friedman *JR* Phone: 255-2302

Reviewed by: Dorothy Rice *D Rice* Phone: 255-2206

Legal Review: EB Date/time: 11/29/93 1:04 p.m.

**California Integrated Waste Management Board**

**Local Assistance and Planning Committee  
December 7, 1993**

**Agenda Item #2**

**Item:** Consideration of Petition for Reduction in the  
Diversion Requirements for the City of Bishop, Inyo  
County and the Unincorporated County of Inyo.

**Background:**

Public Resources Code (PRC) Section 41780 requires that each city and county divert 25% of its waste from landfills by 1995 and 50% by the year 2000. Source Reduction and Recycling Elements (SRRE) are prepared by the cities and counties as a planning guide for meeting the diversion mandates (PRC Section 41000 and 41300). The SRREs describe the programs which the jurisdictions will use to achieve 25% and 50% diversion. PRC Section 41782 allows the California Integrated Waste Management Board (Board) to grant reductions in planning and diversion requirements. Section 18775 of Title 14 of the California Code of Regulations (CCR), identifies the qualifications that each jurisdiction must meet to petition the Board for a reduction in the requirements.

Incorporated areas must have specific characteristics in order to petition for reductions. The required characteristics are:

1. a geographic area of less than 3 square miles,  
or  
a population density of less than 1500 people per  
square mile, and
2. a waste generation rate of less than 100 cubic yards  
per day or 60 tons per day.

Unincorporated areas must have specific characteristics in order to petition for reductions. The required characteristics are:

1. a geographic area less than 1500 square miles,  
or  
a population density of less than 10 people  
per square mile, and
2. a waste generation rate of less than 100  
cubic yards per day or 60 tons/day.

### Requested Reductions

The City of Bishop and the County of Inyo are both requesting a reduction of the diversion requirements of 25% by 1995 to 15 percent.

### Analysis:

#### County Characteristics

Inyo County is located on the east side of the Sierras, north of San Bernardino and Kern Counties and below Mono County. On the East, the County borders the State of Nevada. The County is the second largest County in our state, containing over 10,100 square miles. The County is characterized by its deserts, valleys and steep mountains. Over 98% of the County is publicly owned, and includes Death Valley and a U.S. Naval Weapons Center.

Inyo County has an unemployment rate of 10.3% and a per capita income of \$18,049. The unincorporated portion of the County has a population total of 14,806. The largest concentrations of population in this area are at Lone Pine, with a population of 2,000 and at Big Pine, with 1,500 residents. The City of Bishop (population 3,475) is the only incorporated City within the County.

Tourism is the major economic activity in Inyo County. Employment in the County is primarily service and retail related. There is almost no industrial activity and the commercial sector is devoted to the needs of residents and tourists.

The County of Inyo meets the criteria to petition the Board for reduced diversion and/or planning requirements. Inyo County has a population density of 1.80 persons per square miles, and a waste generation rate of 51.3 tons per day.

Bishop also meets the criteria to petition the Board for reduced diversion and/or planning requirements. Bishop has an area of 1.75 square miles and a waste generation rate of 10.2 tons per day.

### **Solid Waste Collection and Disposal**

There are five landfills and four transfer stations in the County. The majority of County and City residents self-haul their waste to the Bishop-Sunland landfill. In addition, there are two commercial municipal solid waste (MSW) haulers that collect and dispose of MSW within the county. Another hauler collects waste from transfer stations within Inyo County and disposes of it in Kern County.

### **Current Diversion Programs**

The majority of current diversion programs within Inyo County are operated by private businesses, public schools, and local city/county organizations. These activities are mostly centered within and around the City of Bishop.

#### Private Sector

Last year the private sector accepted household plastics, newsprint, all household glass, and bi-metals. Due to the current market environment, they are now only accepting California Redemption Value (CRV) containers, ferrous metals and tin cans. Major markets for the materials generated by the diversion program are 200-300 miles or more away. Also, intra-County transportation distances are great, for instance up to 4.5 hours highway travel time separate Tecopa and the City of Bishop.

Manor Market and Brown's Maintenance and Supply are two small private recyclers in the Bishop area.

Some of the larger generators of secondary materials must ship them back to Los Angeles for processing. These are usually large supermarkets, such as Vons, and retailers which ship old corrugated cardboard.

#### Schools

Many of the local schools have implemented recycling programs. However, they are now curtailing their collection efforts due to poor market economics which is manifested by reluctance of local buy-back centers to accept any items other than aluminum, CRV glass and plastics. Also, the high costs of transporting materials intra-County and to Los Angeles contribute to

poor economics of recycling thereby presently making it very difficult to attain 1995 diversion goals.

County-City

The County-operated Bishop-Sunland landfill diverts white goods, bi-metals, aluminum, newspaper and batteries via a dropoff center.

In summary, Inyo County and the City of Bishop face economic obstacles such as high transportation costs associated with long hauling distances to markets, low value for recycled materials, a lack of local markets for recycled materials, and a limited budget to absorb diversion costs.

The following table summarizes the diversion activities and quantities in 1991. A total of 902 tons are diverted by these activities resulting in a diversion rate of 4% (902 tons diversion divided by 22,438 tons generation).

Estimated Diversion (tons)  
1991

	County Unincorporated	City of Bishop
OCC	194	45
Newspaper	51	12
Ledger	10	2
HDPE	4	1
CRV Glass	107	25
Aluminum Cans	58	14
Non-ferrous & Alum. Scrap	269	63
Food Waste	30	7
Sewage Sludge	0	10

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Totals	723	179
Total Diversion	4%	5%

### Proposed Diversion

The City and County plan to continue existing programs. In addition, both the County and the City plan on implementing a number of new programs to increase their diversion levels.

The following programs were selected for implementation in 1994 by the City and the County.

Source Reduction Program	Percent Diversion
Public Awareness programs	.4
Backyard Composting	.5
Waste Audits	.2
Procurement/Waste Managing Policies	.7
Xeriscaping	.5
Recycling Program	Percent Diversion
Drop-off Containers	2.7
Reuse/exchange area	1.6
Buy Back Centers	2.0
Yard Waste Reuse	3.8
<u>Construction Debris Reuse</u>	<u>2.6</u>
Total	15.0

### Funding

The solid waste program for the City of Bishop and unincorporated Inyo County is funded through a 1/2 cent Transaction and Use Tax (TUT). This tax raises \$773,000 annually which is used completely each year without generating any reserve funds and prior to funding Household Hazardous Waste programs, diversion programs, closure/post-closure funds and Subtitle D upgrades. The money raised through this tax represents 2% of the total combined budget for the County and City.

The County is drafting a revised Solid Waste Fee schedule which if adopted, would target special wastes such as tires,

construction and demolition, tree stumps and other bulky items at the landfill gate. This proposal if adopted, would generate approximately \$60,000 per year for waste management programs and contribute to diversion beginning in January 1994.

#### FUNDING

Revenue (TUT)	\$773,000
<b>Expenses</b>	
Personnel & Office	376,733
Maintenance	159,398
State Mandated Plans	111,000
State Fees	65,000
Transfer & Hauling	55,284
Oil Diversion	7,500
Remainder	0

#### Staff Analysis

##### City and County Staffing

Responsibility for administering the waste management programs is shared among 3 county staff i.e. County Administrative Officer, Deputy County Administrator and the Landfill Operations Manager. The County also employs 5 site operators. The City of Bishop Public Works Director does not have waste management responsibilities. Duties for the county staff are summarized below.

##### County Administrative Officer

- Responsible for all county programs reporting to the Inyo County Board of Supervisors
- Waste Management activities represent approximately 5% of all duties

##### Deputy County Administrator

- Responsible for policy and procedural development for the Inyo County Administrative Services Department
- Provides general direction to the Waste Management Manager

- Other duties include supervision of the County Motor Pool Program; supervision of the Job Training Partnership Act (JTPA); developing projects/programs from policy established by the Board of Supervisors; and is a member of various committees.
- Waste Management activities represent approximately 65% of all duties

Landfill Operations Manager

- Acting under general direction of the Deputy County Administrator, provides advice and consultation on waste related issues to County agencies and officials
- Manages the operation of all waste sites in Inyo County and oversees leased landfill sites, transfer and storage sites
- Directs work activities of 5 site operators, providing employee training and maintains appropriate waste records

City of Bishop-Public Works Director

- Plans and directs City public works programs excluding Waste Management
- Participates in the Local Task Force along with 1 City Council Member

Inyo County and the City of Bishop believe based on their low population and volume of solid waste, limited funding and staff, lack of local markets for recyclables, and remote location which contributes to high transportation costs of secondary materials, that they should be allowed to reduce their diversion goals to 15% from 25% for the short term period.

Board staff believe that the request for a reduction of the short-term goal to 15% is a reasonable request considering the demographic and economic characteristics of Inyo County and the City of Bishop.

Conclusion

Inyo County and the City of Bishop both qualify, under the conditions of PRC Section 41780 and CCR Section 18775, to petition for a reduction in planning and diversion requirements.

CCR Section 18775 requires the petitioning jurisdiction to provide the following information in its petition:

1. a general description of existing disposal and diversion systems, including documentation of the types and quantities of waste disposed and diverted;
2. identification of the specific reductions being requested;
3. documentation of why attainment of diversion and planning requirements is not feasible;
4. the planning and diversion requirements that are achievable, and why.

Board staff have reviewed the petition from the County of Inyo and the City of Bishop and found that it complies with these requirements. Based on the information provided in the petition, Board staff believe that the reductions requested by Inyo County and the City of Bishop are justified.

**Staff comments:**

Board staff recommends that the Committee approve the County's and City's petition for a reduction in the planning and diversion requirements, as specified below:

1. The County and the City shall be required to achieve a 15% reduction in the amount of waste disposed by January 1, 1995.

**ATTACHMENTS**

1. Copy of 14 CCR Section 18775
2. County of Inyo and City of Bishop reduction petition
3. Copy of the Letter from C. Brent Wallace
4. Copy of the Petition addendum
5. Resolution 93-

Prepared by: John Brooks *[Signature]* Phone (916) 255-2314

Prepared by: Steven Hernandez *[Signature]* Phone (916) 255-2316

Reviewed by: John Nuffer *[Signature]* Phone (916) 255-2653

Reviewed by: Judith Friedman *[Signature]* Phone (916) 255-2555

Reviewed by: Dorothy Rice *[Signature]* Phone (916) 255-2206

Legal Review: R Date/Time 11/23 1425

**CALIFORNIA INTEGRATED WASTE MANAGEMENT BOARD**

**RESOLUTION #93 -**

**FOR THE REDUCTION OF DIVERSION  
REQUIREMENTS FOR THE COUNTY OF INYO AND THE CITY OF BISHOP**

**Title 14, Division 7, Chapter 9, Section 18775**

**WHEREAS**, Public Resources Code Section 41782 allows reductions in the diversion and planning requirements specified in Public Resources Code Section 41780 if a city or county can demonstrate that achievement of the mandated requirements is not feasible due to geographical size or low population density, and small waste generation rates; and

**WHEREAS**, Title 14 of the California Code of Regulations, Section 18775 allows for qualifying jurisdictions to petition the Board for reductions in planning and diversion goals mandated by Public Resources Code Section 41780; and

**WHEREAS**, the Board has received a petition for reductions in the diversion and planning requirements from the County of Inyo and the City of Bishop; and

**WHEREAS**, the County of Inyo and the City of Bishop qualify based on geographic size, population density, and small waste generation rates to petition the Board for specified reductions; and

**WHEREAS**, the Board has found that the request for reduction in diversion and planning requirements to allow the County of Inyo and the City of Bishop to achieve a 15% level of waste diversion by January 1, 1995 is reasonable.

**WHEREAS**, the County and City has complied with Public Resources Code Section 41782, and Title 14 of the California Code of Regulations, Section 18775.

**WHEREAS**, the Integrated Waste Management Planning Committee approved the staff recommendation to allow the County of Inyo and the City of Bishop to reduce the short term diversion goals from 25% to 15%.

**NOW, THEREFORE, BE IT RESOLVED** that the Board hereby grants the reduction in diversion requirements to 15% for January 1, 1995.

**BE IT FURTHER RESOLVED**, that if the County and City SRRE has not been locally adopted, and also approved by the Board, by the deadline set in statute, the diversion reductions granted above shall be deemed revoked.

**CERTIFICATION**

The undersigned Executive Director of the California Integrated Waste Management Board does hereby certify that the foregoing is a full, true and correct copy of a resolution duly and regularly adopted by the California Integrated Waste Management Board on December 7, 1993.

Dated:

Ralph E. Chandler  
Executive Director

PETITION FOR A REDUCTION IN THE DIVERSION  
AND PLANNING REQUIREMENTS  
OF THE  
CITY/COUNTY SOURCE REDUCTION AND RECYCLING ELEMENT

APRIL 1993

COUNTY OF INYO  
CITY OF BISHOP

PREPARED BY:  
INYO COUNTY INTEGRATED WASTE MANAGEMENT

PREPARED FOR:  
CALIFORNIA INTEGRATED WASTE MANAGEMENT BOARD  
8800 CAL CENTER DRIVE  
SACRAMENTO, CALIFORNIA 95826

Final-Revised 5/93

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## INTRODUCTION

The following petition has been prepared by Inyo County/City of Bishop for submittal to the California Integrated Waste Management Board to request specific reductions in the AB 939 planning and diversion requirements of the County/City Source Reduction and Recycling Element.

The petition process provides an alternative for qualified rural counties to meet more realistic and attainable diversion rates given their low waste generation levels, population density and limited resources.

Pursuant to CIWMB regulation, a jurisdiction may initiate a request for reductions and exemptions by petitioning the board at a public hearing. Counties may qualify for reductions if they meet the following criteria:

Geographic Size: Areas less than 1500 square miles, or  
Population Density: less than 10 people per square mile, and  
Waste Generation Rate: of less than 100 cu.yds/day or 60 tons/day.

Cities may qualify for reductions if they meet the following criteria:

Geographic Size: Area less than 3 square miles or,  
Population Density: less than 1500 people per square mile, and  
Waste Generation Rate: of less than 100 cu.yds/day or 60 tons/day

## SUMMARY

Inyo County is committed to cooperating with the State to achieve the intentions of AB 939. However, because of the rural nature and relative isolation of Inyo County and the City of Bishop to urban areas of the state, the small population base of the County, and limited access to markets for recyclable materials, the County and City will not be able to feasibly achieve a 25% diversion rate by 1995.

As an alternative, the County and City proposes a series of related programs that will make it feasible to achieve a 15% diversion rate by 1995.

All solid waste programs for both the City and the County are funded by a special 1/2 cent sales tax. The County operates and maintains all solid waste programs for the City of Bishop as well as the unincorporated area. The County manages the solid waste programs for the City of Bishop and as such, the volume of waste disposed is currently artificially separated.

*TO meet The mandates of ~~The~~ ~~Integre~~ AB 939*

## ELIGIBILITY

The County and City meet the criteria established by the Board for filing this petition:

Inyo County unincorporated area:

Population Density	: 1.80 persons/square mile
Geographic Area	: 10,140 sq/miles
Waste Generation Rate	: 51.3 tons/day

City of Bishop:

Population Density	: 1986 persons/square mile
Geographic Area	: 1.75 sq/miles
waste Generation Rate	: 10.2 tons/day

## DIVERSION/PLANNING REQUEST SUMMARY

Inyo County and the City of Bishop request that the diversion level required for the short term planning period (1991-1995) be reduced from 25% to 15%. In addition, the City/County is requesting a reduction in the scope of planning requirements as summarized below.

1) The City/County is requesting the following reductions in diversion:

- A. A reduction of AB 939 diversion goals of 25% diversion by 1995 to 15% diversion by 1995.

Note: The City/County does not believe that they can feasibly meet the medium term (1996-2000) diversion requirement of 50%. However, based on advice from CIWMB staff, the City/County is deferring a request for a reduction in the medium requirements until a later date.

1. Source: Inyo County Planning Department
2. Source: Preliminary Draft SRRE

Since both the County and the City meet the requirements to petition, and the 25% by 1995 and 50% by 2000 reduction goals appear unrealistic for reasons outlined below, the County and the City are petitioning the CIWMB for reduced diversion requirements.

## COUNTY PROFILE

### Location and General Description

Inyo County is located in Central Eastern California, as shown in Figure 1-1. It is bounded on the north by Mono County, on the west by Fresno and Tulare Counties, on the south by Kern and San Bernardino Counties, and on the east by the State of Nevada. Inyo County is the second largest county in the state, containing over 10,100 square miles (nearly 6.5 million acres).

Rugged terrain with steep mountains, valleys, and deserts characterize the County. The largest population centers in the County are found in the Owens Valley, which is located near the western edge of the County. Over 98 percent of the land in Inyo County is publicly owned. Nearly 6 million acres are owned by the Federal government including the Death Valley National Monument, Bureau of Land Management lands, and a U.S. Naval Weapons Center. Other publicly held lands are owned by the State of California, the City of Los Angeles, and Inyo County.

### Population

In contrast to its size geographically, the population of the unincorporated area of Inyo County is small; the 1990 census estimation is that 14,806 persons (less than 2 persons per square mile) live in Inyo County. The population within Inyo County has grown at a rate of less than 0.2 percent per year over the last ten years. Population growth is expected to remain slow because of the large percentage of publicly held lands.

The current unemployment rate in Inyo County is listed at 10.3% and the per capita income is \$18,049.<sup>3</sup>

One incorporated city exists in Inyo County - the City of Bishop. The City has a population of 3,475 and an area of 1.75 square miles. This gives a population density of 1,986 persons per square mile. Inyo County also includes other unincorporated communities with populations summarized below:

- Big Pine - 1,500 residents
- Independence - 750 residents
- Lone Pine - 2,000 residents
- Olancho - 350 residents

3. Source: Employment Development Department, April '93

- Furnace Creek - approximately 150 residents with thousands of tourists throughout the year
- Shoshone - approximately 250 year-round residents, up to 1,000 during winter months
- Tecopa Hot Springs - approximately 300 year-round residents, up to 3,000 during winter months

Figure 1-2 shows the location of Bishop and the other unincorporated population centers within Inyo County.

The approximate distances from Independence, the county seat, to the nearest major population centers are as follows:

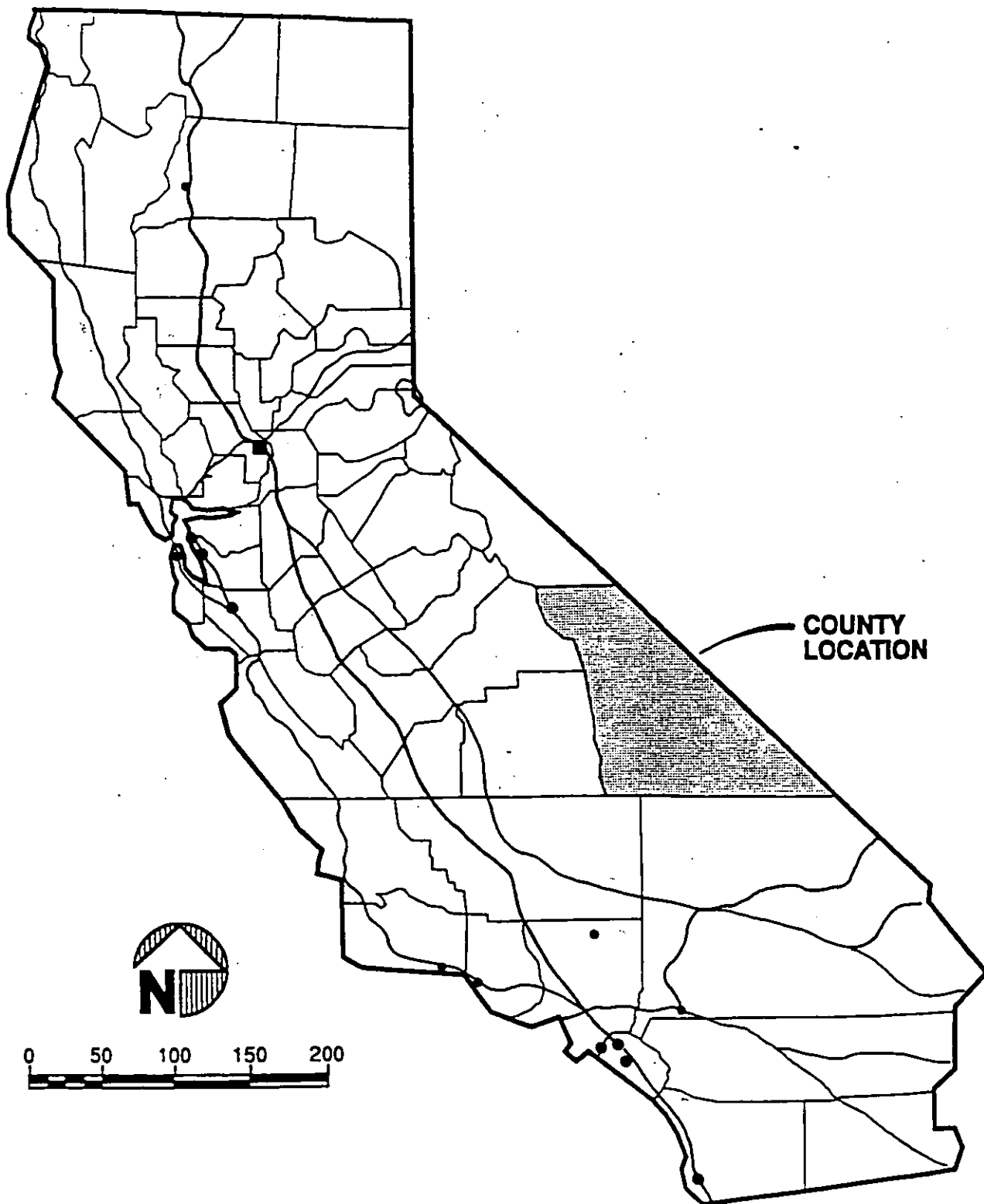
Los Angeles:	240
Sacramento:	350
Bakersfield:	180
Reno, Nevada:	225

#### Economics

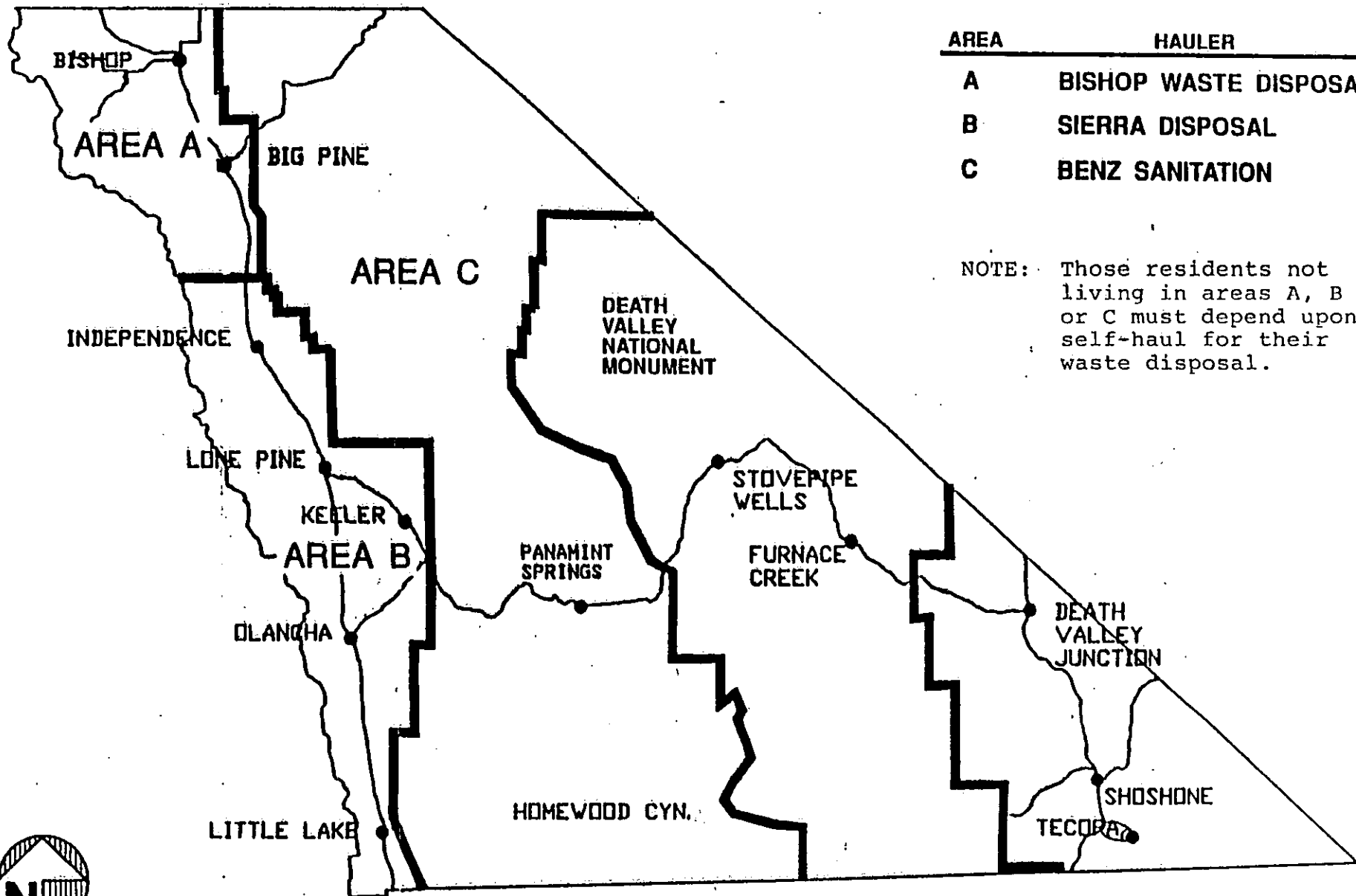
Tourism provides the major economic base for Inyo County. Fishing and camping during the summer and skiing during the winter are the major tourist activities. The Death Valley National Monument attracts tourists throughout the year.

Employment in Inyo County is primarily in the services and retail trade sectors. Additional jobs are provided by government and the construction industry (Inyo County, 1991 Update Overall Economic Development Plan).

There is no industrial base and most of the commercial sector is devoted to serving the needs of the local residents and the tourist industry.



**FIGURE 1-1**  
**INYO COUNTY LOCATION**  
 SOURCE REDUCTION AND RECYCLING ELEMENT  
 INYO COUNTY, CALIFORNIA



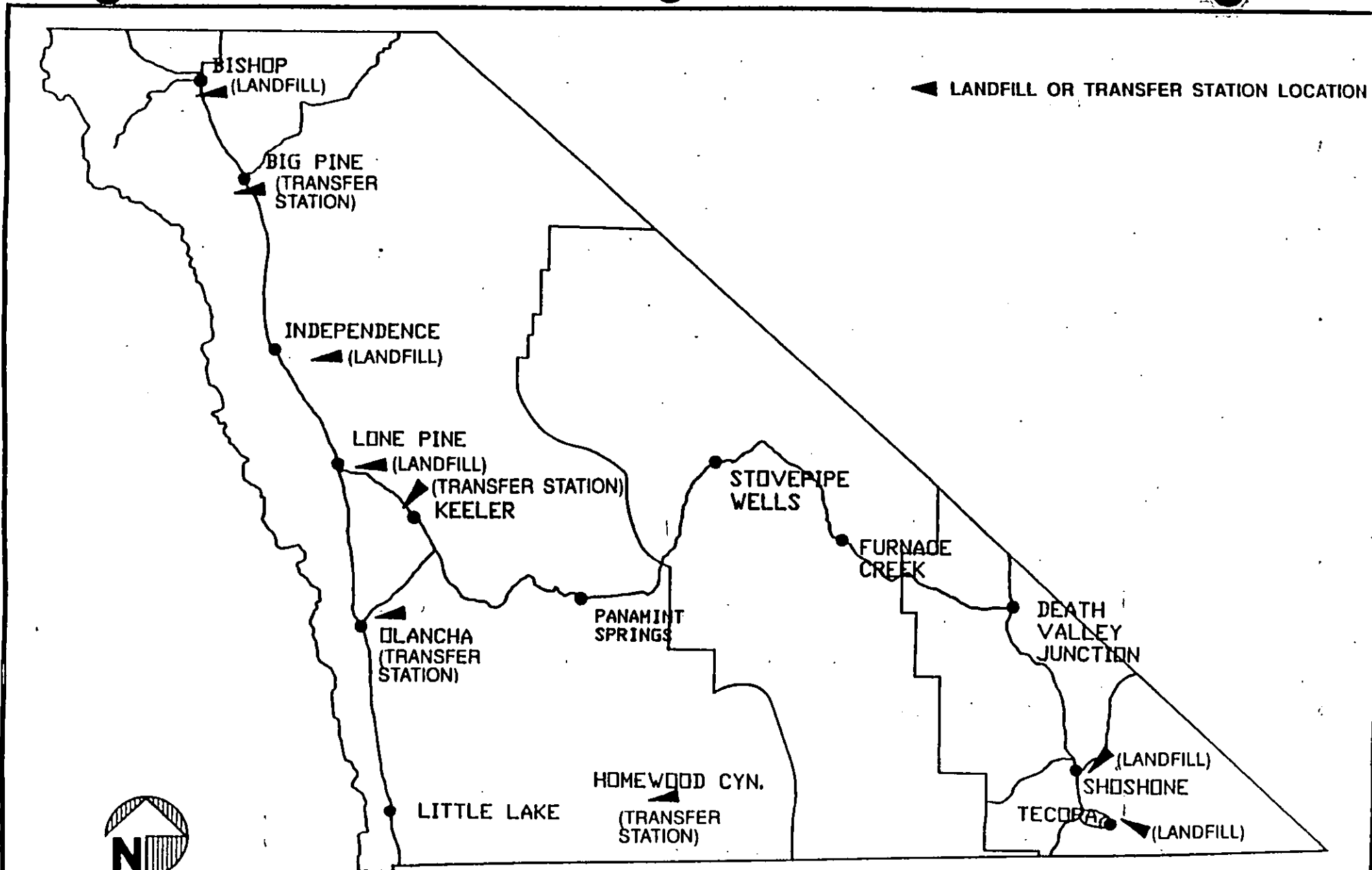
AREA	HAULER
A	BISHOP WASTE DISPOSAL
B	SIERRA DISPOSAL
C	BENZ SANITATION

NOTE: Those residents not living in areas A, B or C must depend upon self-haul for their waste disposal.



NOT TO SCALE

FIGURE 1-2  
HAUL AREAS AND MAJOR POPULATION CENTERS  
SOURCE REDUCTION AND RECYCLING ELEMENT  
INYO COUNTY, CALIFORNIA



**FIGURE 1-3**  
**LANDFILL AND TRANSFER STATION LOCATIONS**  
 SOURCE REDUCTION AND RECYCLING ELEMENT  
 INYO COUNTY, CALIFORNIA

PETITION  
FOR  
REDUCTION OF AB 939 DIVERSION AND PLANNING REQUIREMENTS  
FOR  
INYO COUNTY/CITY OF BISHOP, JANUARY 1993

INTRODUCTION

Background and Existing Conditions

The County of Inyo and the City of Bishop have fostered a commitment to recycling within each County community. The majority of recycling activity currently occurs in and around the Bishop city limits.

The majority of recycling in Inyo County is performed by private businesses, public schools, and local City/County organizations, as described below:

- Recycling by Private Businesses - Private recyclers operating in the County include Manor Market and Brown's Maintenance and Supply. Material accepted by these centers is described in Exhibit A. Some businesses collect their own internally generated recyclable waste and ship it to recycling markets in the Los Angeles area (e.g., large supermarkets and retailers recycle corrugated cardboard used in product packaging).
- Recycling by Public Schools - Many of Inyo County's schools have implemented recycling programs, including Bishop Pine Street School, Lo-Inyo School, Owens Valley Unified School, and the Round Valley Elementary School. However, due to current recycling material markets, the schools have reduced most of their recycling efforts.
- Recycling by Local County Organizations - The Inyo County Courthouse and County-operated Bishop-Sunland landfill currently recycled some material as described in Exhibit A.

Note: Most all of the schools and public agencies have been forced to abandon their respective recycling programs due to market gluts and the reluctance on the part of the local buy-back centers to accept any items other than aluminum and CA redemption glass and plastics). Inyo County strongly supports the intent of AB 939 and similar waste reduction measures. Currently,

two redemption centers operate in Bishop and one in Lone Pine. Manor Market in Bishop receives CA redemption glass and plastics along with aluminum only. Brown's Supply, also located in Bishop, receives aluminum, ferrous metals and tin cans only. The Lone Pine buy-back center receives only CA redemption material and aluminum. Until approximately 10 months ago, the centers combined to receive all household plastics, newsprint, all household glass and bi-metals. An apparent market glut coupled with the high cost of transportation to the various markets forced the centers to no longer accept any material other than CA redemption material.

#### Solid Waste Services

Two commercial haulers exist in Inyo County who collect municipal waste and haul it to landfills located in Inyo County; Bishop Disposal and Sierra Disposal. Another hauler, Benz Sanitation, collects waste from transfer stations located in rural areas of the County and transports the waste to a landfill located in Kern County. Figure 1-2 shows the haul areas for these garbage collection companies.

There are five major landfills in Inyo County. Figure 1-3 shows these landfill locations.

In addition to these landfills, four transfer stations operate in Inyo County; Big Pine Transfer, Keeler Transfer, Olancho Transfer, and Homewood Canyon Transfer. Transfer station locations are shown on Figure 1-3.

## SOLID WASTE GENERATION STUDY

A Solid Waste Generation Study was completed for both the City of Bishop and the unincorporated areas of Inyo County pursuant to Article 6.1 of the Planning Guidelines issued by the Board. The results of the study are summarized in Tables 1, 2, 3, and 4.

### Waste Stream Projections

Annual waste stream projections over the next 15 years were performed for:

- Current Conditions - The waste stream grows at a projected rate of 2 percent per year and no additional waste diversion programs are implemented.
- SRRE Conditions - The waste stream changes by implementation of programs presented in this SRRE.

Tables 5 and 6 summarize estimated aggregate waste stream disposal by year for Inyo County under current SRRE conditions.

The 1995 and 2000 recycling goals for Inyo County, and the City of Bishop are shown in Tables 7 and 8.

### Current Diversion Activities

As discussed earlier, the greater Bishop area accounts for the bulk of recycling within Inyo County. There is a redemption center in Lone Pine and two centers in Bishop. However, these facilities are 60 miles apart and are not readily accessible to residents in the southern portion of the County (Olancho, Keeler, Shoshone, and Tecopa).

These areas are approximately four hours one-way driving time to the redemption centers.

A breakdown of materials disposed and diverted in the County in 1991 is provided in the table below:

1991 Countywide Waste Disposal Inyo County, California (tons/year)				
Waste Category	Bishop	Unincorporated	Total	Percent of Total Disposal Tonnage
Total Paper	844	4025	4970	23.08%
Corr. Container	142	607	750	3.48%
Mixed	317	1353	1670	7.76%
Newspaper	138	590	728	3.38%
High Grade Ledger	62	263	324	1.51%
Other	284	1213	1497	6.95%
Total Plastic	304	1297	1602	7.44%
HDPE	29	123	152	0.71%
PET	21	91	113	0.52%
Film Plastics	184	825	1019	4.73%
Other	60	257	318	1.47%
Total Glass	143	612	755	3.51%
Refill Beverage Cont.	40	172	213	0.99%
CA RED Value Glass	57	242	299	1.39%
Other Recycle Glass	45	193	238	1.11%
Other Non-recycle Glass	1	4	5	0.02%
Total Metals	162	691	854	3.98%
Aluminum Cans	8	32	40	0.18%
Bi-metal Cans	4	15	19	0.09%
Ferrous & Tin Cans	113	482	595	2.76%
Non Fer. & Alum Scrap	23	100	123	0.57%
White Goods	13	56	69	0.32%
Other Metals	2	7	9	0.04%
Yard Waste	870	4248	5118	23.75%
Other Organics	555	2367	2922	13.57%
Food Waste	231	986	1217	5.65%
Tires & Rubber Prod.	59	251	309	1.44%
Wood Waste	117	498	615	2.85%
Crop Residues	0	0	0	0.00%
Manure	29	123	152	0.71%
Textiles & Leather	118	495	611	2.84%
Other Misc. Organics	3	14	17	0.08%
Other Wastes	482	2054	2536	11.77%
Construction Debris	450	1920	2370	11.01%
House Haz Waste	13	54	67	0.31%
House Haz Waste Cont	19	79	98	0.46%
Special Wastes	88	2697	2785	12.92%
Ash	58	238	294	1.37%
Septage	0	2319	2319	10.77%
Sewage Sludge	0	10	10	0.05%
Industrial Sludge	0	0	0	0.00%
Asbestos	0	0	0	0.00%
Auto Waste/Bodies	4	16	20	0.09%
Dead Animals	14	62	76	0.35%
Furniture	12	52	64	0.30%
Total	3547	17989	21536	100.00%

**Table 1**  
**1991 Waste Disposal by Waste Source**  
**Inyo County, California**  
**(tons/year)**

Waste Category	Residential		Commercial		Industrial	
	Tons	Percent of Total Residential Disposal	Tons	Percent of Total Commercial Disposal	Tons	Percent of Total Industrial Disposal
Total Paper	3018	19.93%	1952	48.49%	0	0.00%
Corr. Container	337	2.22%	413	10.28%	0	0.00%
Mixed	1052	6.95%	619	15.37%	0	0.00%
Newspaper	583	3.85%	145	3.60%	0	0.00%
High Grade Ledger	135	0.89%	189	4.70%	0	0.00%
Other	911	6.02%	588	14.56%	0	0.00%
Total Plastic	995	6.57%	607	15.08%	0	0.00%
HDPE	116	0.77%	38	0.89%	0	0.00%
PET	92	0.61%	21	0.52%	0	0.00%
Film Plastics	568	3.75%	451	11.21%	0	0.00%
Other	219	1.44%	99	2.48%	0	0.00%
Total Glass	596	3.94%	159	3.95%	0	0.00%
Refil Beverage Cont.	175	1.16%	37	0.93%	0	0.00%
CA RED Value Glass	227	1.50%	72	1.79%	0	0.00%
Other Recyc Glass	188	1.24%	50	1.24%	0	0.00%
Other Non-recyc Glass	5	0.03%	0	0.00%	0	0.00%
Total Metals	690	4.56%	164	4.07%	0	0.00%
Aluminum Cans	27	0.18%	13	0.32%	0	0.00%
Bi-metal Cans	18	0.12%	1	0.02%	0	0.00%
Ferrous & Tin Cans	483	3.08%	132	3.28%	0	0.00%
Non Fer. & Alum Scrap	114	0.75%	9	0.23%	0	0.00%
White Goods	69	0.48%	0	0.00%	0	0.00%
Other Metals	0	0.00%	9	0.21%	0	0.00%
Yard Waste	4933	32.58%	183	4.54%	0	0.00%
Other Organics	2016	13.31%	908	22.51%	0	0.00%
Food Waste	697	4.60%	520	12.93%	0	0.00%
Tires & Rubber Prod.	221	1.46%	88	2.19%	0	0.00%
Wood Wastes	437	2.89%	178	4.41%	0	0.00%
Crop Residues	0	0.00%	0	0.00%	0	0.00%
Manure	152	1.00%	0	0.00%	0	0.00%
Textiles & Leather	491	3.25%	120	2.98%	0	0.00%
Other Misc. Organics	17	0.11%	0	0.00%	0	0.00%
Other Wastes	130	0.86%	35	0.87%	2370	89.16%
Construction Debris	0	0.00%	0	0.00%	2370	89.16%
House Haz Waste	65	0.43%	2	0.05%	0	0.00%
House Haz Waste Cont.	65	0.43%	33	0.82%	0	0.00%
Special Wastes	2763	18.25%	20	0.50%	20	0.84%
Ash	304	2.01%	0	0.00%	0	0.00%
Septage	2319	15.32%	0	0.00%	0	0.00%
Sewage Sludge	0	0.00%	0	0.00%	20	0.84%
Industrial Sludge	0	0.00%	0	0.00%	0	0.00%
Asbestos	0	0.00%	0	0.00%	0	0.00%
Auto Waste/Bodies	0	0.00%	20	0.50%	0	0.00%
Dead Animals	76	0.50%	0	0.00%	0	0.00%
Furniture	64	0.42%	0	0.00%	0	0.00%
Total	15140	100.00%	4025	100.00%	2390	100.00%

**Table 2**  
**1991 Countywide Waste Disposal**  
**Inyo County, California**  
**(tons/year)**

Waste Category	Bishop	Unincorporated	Total	Percent of Total Disposal Tonnage
Total Paper	944	4025	4970	23.08%
Corr. Container	142	607	750	3.48%
Mixed	317	1353	1670	7.76%
Newspaper	138	590	728	3.38%
High Grade Ledger	62	263	324	1.51%
Other	284	1213	1497	6.95%
Total Plastic	304	1297	1602	7.44%
HDPE	29	123	152	0.71%
PET	21	91	113	0.52%
Rim Plastics	194	825	1019	4.73%
Other	60	257	318	1.47%
Total Glass	143	612	755	3.51%
Refill Beverage Cont.	40	172	213	0.99%
CA RED Value Glass	57	242	299	1.39%
Other Recyc Glass	45	193	238	1.11%
Other Nonrecyc Glass	1	4	5	0.02%
Total Metals	162	691	854	3.96%
Aluminum Cans	8	32	40	0.18%
Bi-metal Cans	4	15	19	0.09%
Ferrous & Tin Cans	113	482	595	2.76%
Non Fer. & Alum Scrap	23	100	123	0.57%
White Goods	13	56	69	0.32%
Other Metals	2	7	9	0.04%
Yard Waste	870	4246	5116	23.75%
Other Organics	555	2367	2922	13.57%
Food Waste	231	986	1217	5.65%
Tires & Rubber Prod.	59	251	309	1.44%
Wood Wastes	117	498	615	2.85%
Crop Residues	0	0	0	0.00%
Manure	29	123	152	0.71%
Textiles & Leather	116	495	611	2.84%
Other Misc. Organics	3	14	17	0.08%
Other Wastes	482	2054	2535	11.77%
Construction Debris	450	1920	2370	11.01%
House Haz Waste	13	54	67	0.31%
House Haz Waste Cont	19	79	98	0.46%
Special Wastes	88	2705	2783	12.92%
Ash	58	246	304	1.41%
Septage	0	2319	2319	10.77%
Sewage Sludge	0	10	10	0.05%
Industrial Sludge	0	0	0	0.00%
Asbestos	0	0	0	0.00%
Auto Waste/Bodies	4	16	20	0.09%
Dead Animals	14	62	76	0.35%
Furniture	12	52	64	0.30%
<b>Total</b>	<b>3549</b>	<b>17997</b>	<b>21536</b>	<b>100.00%</b>

**Table 3**  
**1991 Countywide Waste Diversion**  
**Inyo County, California**  
**(tons/year)**

Waste Category			Total	Diverted as Percent of Total Generated
	Bishop	Unincorporated		
Total Paper	60	254	314	5.94%
Con. Container	45	194	239	24.18%
Mixed	0	0	0	0.00%
Newspaper	12	51	63	7.96%
High Grade Ledger	2	10	12	3.57%
Other	0	0	0	0.00%
Total Plastic	1	4	5	0.31%
HDPE	1	4	5	3.18%
PET	0	0	0	0.00%
Film Plastics	0	0	0	0.00%
Other	0	0	0	0.00%
Total Glass	25	107	132	14.88%
Refil Beverage Cont.	0	0	0	0.00%
CA RED Value Glass	25	107	132	30.61%
Other Recyc Glass	0	0	0	0.00%
Other Non-recyc Glass	0	0	0	0.00%
Total Metals	77	327	404	32.12%
Aluminum Cans	14	58	72	64.49%
Bi-metal Cans	0	0	0	0.00%
Ferrous & Tin Cans	0	0	0	0.00%
Non Fer. & Alum Scrap	63	269	332	72.96%
White Goods	0	0	0	0.00%
Other Metals	0	0	0	0.00%
Yard Waste	0	0	0	0.00%
Other Organics	7	30	37	1.25%
Food Waste	7	30	37	2.95%
Tires & Rubber Prod.	0	0	0	0.00%
Wood Wastes	0	0	0	0.00%
Crop Residues	0	0	0	-
Manure	0	0	0	0.00%
Textiles & Leather	0	0	0	0.00%
Other Misc. Organics	0	0	0	0.00%
Other Wastes	0	0	0	0.00%
Construction Debris	0	0	0	0.00%
House Haz Waste	0	0	0	0.00%
House Haz Waste Cont	0	0	0	0.00%
Special Wastes	10	0	10	0.36%
Ash	0	0	0	0.00%
Septage	0	0	0	0.00%
Sewage Sludge	10	0	10	50.00%
Industrial Sludge	0	0	0	-
Asbestos	0	0	0	-
Auto Waster/Bodies	0	0	0	0.00%
Dead Animals	0	0	0	0.00%
Furniture	0	0	0	0.00%
<b>Total</b>	<b>179</b>	<b>723</b>	<b>902</b>	<b>4.02%</b>

Table 4 1991 Countywide Waste Generation Inyo County, California (tons/year)				
Waste Category	Bishop	Unincorporated	Total	Percent of Total Generated Tonnage
Total Paper	1004	4280	5284	23.55%
Cart. Container	188	801	989	4.41%
Mixed	317	1353	1670	7.44%
Newspaper	150	641	791	3.53%
High Grade Ledger	64	272	336	1.50%
Other	284	1213	1497	6.67%
Total Plastic	305	1301	1607	7.16%
HDPE	30	127	157	0.70%
PET	21	91	113	0.50%
Film Plastics	194	825	1019	4.54%
Other	60	257	318	1.42%
Total Glass	169	719	887	3.95%
Refill Beverage Cont.	40	172	213	0.95%
CA RED Value Glass	82	349	431	1.92%
Other Recyc Glass	45	193	238	1.06%
Other Non-recyc Glass	1	4	5	0.02%
Total Metals	239	1019	1258	5.61%
Aluminum Cans	21	90	112	0.50%
Bi-metal Cans	4	15	19	0.08%
Ferrous & Tin Cans	113	482	595	2.65%
Non Fer. & Alum Scrap	86	369	455	2.03%
White Goods	13	56	69	0.31%
Other Metals	2	7	9	0.04%
Yard Waste	870	4246	5116	22.80%
Other Organics	562	2397	2959	13.19%
Food Waste	238	1016	1254	5.59%
Tires & Rubber Prod.	59	251	309	1.38%
Wood Wastes	117	498	615	2.74%
Crop Residues	0	0	0	0.00%
Manure	29	123	152	0.68%
Textiles & Leather	116	495	611	2.72%
Other Misc. Organics	3	14	17	0.08%
Other Wastes	482	2054	2535	11.30%
Construction Debris	450	1920	2370	10.56%
House Haz Waste	13	54	67	0.30%
House Haz Waste Cont	19	79	98	0.44%
Special Wastes	98	2705	2793	12.45%
Ash	58	246	304	1.35%
Septage	0	2319	2319	10.34%
Sewage Sludge	10	10	20	0.09%
Industrial Sludge	0	0	0	0.00%
Asbestos	0	0	0	0.00%
Auto Waste/Bodies	4	16	20	0.09%
Dead Animals	14	62	76	0.34%
Furniture	12	52	64	0.29%
Total	3728	18719	22438	100.00%

Table 5 Waste Disposal Projections (Current Conditions, Inyo County, CA)						
	Bishop		Unincorporated		Total	
	cubic yards	tons	cubic yards	tons	cubic yards	tons
1991	12933	4094	55136	17452	68069	21546
1992	13195	4176	56251	17801	69445	21976
1993	13459	4259	57376	18157	70834	22416
1994	13728	4344	58523	18520	72251	22864
1995	14002	4431	59694	18890	73696	23322
1996	14282	4520	60888	19268	75170	23788
1997	14568	4610	62105	19654	76673	24264
1998	14859	4702	63348	20047	78207	24749
1999	15156	4796	64615	20448	79771	25244
2000	15460	4892	65907	20857	81366	25749
2001	15769	4990	67225	21274	82994	26264
2002	16084	5090	68569	21699	84654	26789
2003	16406	5192	69941	22133	86347	27325
2004	16734	5296	71340	22576	88074	27871
2005	17069	5401	72766	23027	89835	28429

Table 6 Waste Disposal Projections (SRRE Conditions, Inyo County, CA)						
	Bishop		Unincorporated		Total	
	cubic yards	tons	cubic yards	tons	cubic yards	tons
1991	12933	4094	55136	17452	68069	21546
1992	13195	4175	56250	17801	69445	21976
1993	12824	4058	54672	17301	67496	21360
1994	12457	3942	53105	16806	65562	20748
1995	12092	3827	51551	16314	63643	20140
1996	11912	3770	50782	16070	62694	19840
1997	11735	3713	50026	15831	61761	19545
1998	11560	3658	49284	15596	60844	19255
1999	11390	3604	48555	15366	59945	18970
2000	11222	3551	47841	15139	59063	18691
2001	11446	3622	48797	15442	60244	19064
2002	11675	3695	49773	15751	61449	19446
2003	11909	3769	50769	16066	62678	19835
2004	12147	3844	51784	16387	63931	20231
2005	12390	3921	52820	16715	65210	20636

Table 7  
Recycling Diversion Goals by Waste Type  
Unincorporated Areas of Inyo County, California

Targeted Materials	1995			2000		
	Diversion Goal (tons)	Percent of Waste Stream	Targeted Material Reduction	Diversion Goal (tons)	Percent of Waste Stream	Targeted Material Reduction
Corrugated Cardboard	308	1.6	35	335	1.6	35
Newspaper	89	0.5	13	124	0.6	16
Ledger Paper	74	0.4	25	130	0.6	40
HDPE Plastic	35	0.2	25	38	0.2	25
PET Plastic	0	0	0	27	0.1	25
Refill. Beverage Containers	0	0	0	52	0.3	25
California Redemption Glass	132	0.7	35	153	0.7	37
Other Recycling Glass	0	0	0	115	0.6	50
Aluminum Cans	64	0.3	65	70	0.3	65
Nonferrous Metal/ Aluminum Scrap	300	1.6	75	330	1.6	75
Construction Debris	416	2.2	20	918	4.4	40
Yard Waste	897	4.7	20	1486	7.2	30
Textiles and Leather	107	0.6	20	237	1.1	40
White Goods	12	0.1	20	27	0.1	40
Total	2,434	12.7		4,042	19.5	

NOTE: A large portion of diversion will come from recycling efforts.

In addition, source reduction efforts will contribute to the diversion. See Table 7-A.

Table 7-A  
Source Reduction Diversion Goals by Waste Type  
Unincorporated Areas of Inyo County, California

Targeted Materials	1995			2000		
	Diversion Goal (tons)	Percent of Waste Stream	Targeted Material Reduction (%)	Diversion Goal (tons)	Percent of Waste Stream	Targeted Material Reduction (%)
Mixed paper	73	0.4	5	162	0.8	10
Other paper	66	0.3	5	145	0.7	10
Film plastics	45	0.2	5	99	0.5	10
Yard waste	224	1.2	5	495	2.4	10
Food	55	0.3	5	121	0.6	10
Total	462	2.4		1,022	4.9	

**Table 8**  
**Recycling Diversion Goals by Waste Type**  
**Bishop, California**

Targeted Materials	1995			2000		
	Diversion Goal (tons)	Percent of Waste Stream	Targeted Material Reduction	Diversion Goal (tons)	Percent of Waste Stream	Targeted Material Reduction
Corrugated Cardboard	73	1.6	35	83	1.7	35
Newspaper	22	0.5	13	29	0.6	16
Ledger Paper	17	0.4	25	30	0.6	40
HDPE Plastic	8	0.2	25	9	0.2	25
PET Plastic	0	0	0	7	0.1	25
Refill. Beverage Containers	0	0	0	12	0.3	25
California Redemption Glass	31	0.7	35	33	0.7	34
Other Recycling Glass	0	0	0	27	0.6	50
Aluminum Cans	15	0.3	65	16	0.3	65
Nonferrous Metal/ Aluminum Scrap	70	1.6	75	78	1.6	75
Construction Debris	97	2.2	20	215	4.4	40
Yard Waste	210	4.7	20	348	7.2	30
Textiles and Leather	25	0.6	20	55	1.1	40
White Goods	3	0.1	20	6	0.1	40
Total	571	12.7		948	19.5	

Table 8-A  
Source Reduction Diversion Goals by Waste Type  
Bishop, California

Targeted Materials	1995			2000		
	Diversion Goal (tons)	Percent of Waste Stream	Targeted Material Reduction (%)	Diversion Goal (tons)	Percent of Waste Stream	Targeted Material Reduction (%)
Mixed Paper	17	0.4	5	38	0.8	10
Other Paper	15	0.3	5	34	0.7	10
Film Plastics	10	0.2	5	23	0.5	10
Yard Waste	53	1.2	5	116	2.4	10
Food	13	0.3	5	29	0.6	10
Total	108	2.4		240	4.9	

## REASONS WHY A 25% DIVERSION LEVEL CANNOT BE ACHIEVED

The City/County SRRE outlines programs that indicate under the best case scenario that a 15% waste diversion is achievable. In addition, in order to achieve this short term goal, the County must incur start-up cost of \$57,404 and annual maintenance costs of \$60,000 to \$80,000.

### Barriers to Successful Program Implementation

The factors present in Inyo County which present significant barriers to successful implementation of the identified programs are as follows:

#### Limited Availability of County Staff

The success of the source reduction programs will be dependent on the voluntary cooperation of local businesses and merchants. The County will only be able to provide limited program coordination and will have to rely on business or trade groups to provide the technical assistance and promotional assistance required to make the program effective.

All programs would require the County to contract for the labor and services to collect, sort, and ship the recovered materials at additional costs beyond those mentioned above. Any sorting program will be labor intensive and would be impossible to implement without outside or contract labor. The process is overly cumbersome and places an unreasonable administrative and financial burden on the County.

### Funding Difficulties and Source of Funds

The solid waste program in Inyo County is funded by a 1/2 cent transaction and use tax (TUT). At present, the tax is used to administer the solid waste program without generating any reserve funds. In other words, the total revenue generated by the T.U.T. is used to just operate the solid waste program, these are limited revenues. The tax cannot be increased to generate more revenue period. Inyo County cannot institute gate or tipping fees due to the fact that four of the five landfills are unmanned. Additionally, even if each site were manned, gate fees could not be imposed due to the fact that residents would more than likely dump their waste in some remote area away from the landfill. Inyo County is the second largest county in the state geographically and each landfill is surrounded by miles of open space.

Currently Inyo County's solid waste budget is \$773,000 annually. The total County 92/93 budget is 37 million and the City of Bishop budget is 5.37 million for a combined total of 42.370 million. Solid waste represents approximately 2% of the combined County and City budgets, prior to implementation of diversion programs, closure/post closure requirements and the upcoming Subtitle D regulations. In the Federal Register (Volume 56, No. 196, Page 50,989) the Federal EPA has determined that a significant impact threshold occurs when compliance costs exceed one percent of a community's total budget.

Inyo County's waste contribution to the total generated by the State of California amounts to less than .00000134%. Inyo County residents must pay a dis-proportionate share of annual disposal costs when compared to residents in urban areas. (Inyo County average per capita annual cost is \$44.44 in addition to commercial collection fees).

In addition to the costs of the waste diversion programs, the County will also be responsible for the costs of the Household Hazardous Waste Program (Start-up \$80,000 to \$85,000, annual cost \$24,000 to \$50,000) and the annual monitoring and reporting required by AB 939.

Finally, the County budget has been reduced dramatically for the 92/93 fiscal year. The County employees voted October 21, 1992 to take 5 non-paid furlough leave days in an effort to help balance the general fund budget. It is anticipated that the County general fund will have a fund balance of less than \$200,000 at the end of the 1992/1993 fiscal year.

### 1992/93 Expenditure for Solid Waste

Personnel & Office	-	\$376,733
Maintenance	-	\$159,398
State Mandated Plans	-	\$111,000
State Fees	-	\$65,000
Transfer & Hauling	-	\$55,284
Oil Diversion	-	\$7,500
Total	=	\$773,000

### Lack of Local Markets

The absence of local markets and the constant fluctuation in market prices has had a negative impact on the value of recyclables. The situation has effectively created disincentives for the implementation of more diverse and intensive source reduction programs administered by both private individuals and local businesses. Currently it costs approximately \$30 a ton to transport materials to a market.

Secondary impacts associated with the absence of local markets within the jurisdiction include the disproportionate amount of time required to reach regional markets that consistently offer more competitive buy-back policies for consumers.

The most accessible markets for recycled materials (excluding the County Small Redemption Centers) are in Southern California. Minimum travel time from any one of the redemption centers to the southern California markets is 5 hours. The costs of a typical round trip could easily consume and exceed the revenues generated from the material.

### Access to Markets

The remote location of Inyo County in relation to the markets for recovered materials severely impacts the financial feasibility of recycling programs in this region. The program economics have been prepared without any consideration of a revenue from the sale of recovered materials. Under present market conditions, the transporters or shippers of the materials (glass, newspaper, corrugated cardboard) will have to utilize any revenues received to offset the cost of transportation. The prices for these materials have decreased significantly and the cost of transportation will have to be subsidized by the County.

## PROPOSED ALTERNATIVE WASTE DIVERSION PLAN

Inyo County is committed to pursuing a waste reduction program that is effective in increasing the diversion of recyclable material from our landfills but is also responsive to the fiscal realities of the County. By working with the Local Task Force and its consultants, the County has developed a program that it believes meets both of these objectives. Details of the program are provided below:

### PROPOSED ALTERNATIVE DIVERSION PROGRAM

A description of the following programs and time tables are contained in the final SRRE attached to the petition. It is anticipated that these programs will cost \$60,000/\$80,000 annually to maintain.

<u>PROGRAM</u>	<u>EXPECTED DIVERSION</u>			
	Inyo County		City/Bishop	
	1995	2000	1995	2000
<b>Source Reduction</b>				
Jurisdictional Lobbying	0.2%	0.5%	0.2%	0.5%
Public Awareness Programs	0.2%	0.5%	0.2%	0.5%
Backyard Composting	0.5%	1.0%	0.5%	1.0%
Waste Audits	0.2%	0.5%	0.2%	0.5%
Procurement/Waste Managing Policies	0.7%	1.5%	0.7%	1.5%
Xeriscaping	0.5%	1.0%	0.5%	1.0%
<b>Recycling</b>				
Dropoff Containers at Landfill	2.7%	4.5%	2.7%	4.5%
Refuse Exchange at Landfill	1.6%	2.7%	1.6%	2.7%
Buy Back Centers	2.0%	2.2%	2.0%	2.2%
Yard Waste Reuse	3.8%	5.6%	3.8%	5.6%
Construction Debris Reuse	2.6%	4.5%	2.6%	4.5%
<b>Composting</b>				
Centralized Composting	0.0%	2.4%	0.0%	2.4%
<b>Special Waste</b>				
Sludge Land Application	0.0%	0.2%	0.0%	0.2%
<b>Total</b>	<b>15.0%</b>	<b>27.1%</b>	<b>15.0%</b>	<b>27.1%</b>

The County believes that this combination of programs offers the following advantages:

- All programs are related; that is, they discuss the issues of public education and awareness providing guidance in promoting source reduction and recycling.
- Costs associated with program implementation are minimized and within the limited budget available for solid waste.
- A reasonable and obtainable diversion level can be achieved.

## REDUCTION OF PLANNING REQUIREMENTS

This section discusses general and specific modifications of planning requirements which are needed for the Inyo County/ City of Bishop SRRE.

### Future Waste Generation Studies

Inyo County is small in population and divided into several isolated wastesheds, as shown on figure 1-3. Future waste generation studies required for SRRE revisions and monitoring and evaluation of diversion programs would be difficult and costly.

In Inyo County, the establishment and maintenance of any recycling/reduction program is expected to be of higher priority in reaching diversion goals than the expense of performing statistically representative and seasonal waste characterizations in each of the wastesheds.

Based upon County projections from the California Department of Finance, growth in Inyo County is projected to increase less than 2% annually over the next ten years. This would indicate very little, if any, change in the composition of the waste in Inyo County. It is not practical or warranted to expend staff time and expense to perform unnecessary waste generation studies.

### CONCLUSION

Inyo County/City of Bishop is strongly committed to establishing successful recycling and source reduction programs. However, due to the low population, low volume of solid waste generated, isolation from markets, lack of funds and staff, and other factors, the County and the City of Bishop is petitioning the Waste Management Board for a reduction in diversion goals and planning requirements.

The County proposes to implement recycling and reduction programs to the maximum extent possible. These programs include recycling as many types of material as possible (in particular corrugated cardboard, paper, HDPE plastic, and scrap metals) and establishing a strong educational program for drop off and buy back centers, residents, businesses, schools, and visitors. However, the strength of any recycling depends upon market conditions for materials.

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## EXHIBIT A

- Corrugated Containers: A lot of this material is sorted and bailed at the Bishop-Sunland landfill by Brown's Maintenance and Supply. It is periodically shipped to the Los Angeles area. Von's markets, K-Mart and Payless Drug bail and ship their corrugated cardboard to the Los Angeles area.
- Newspaper: Collected at the Bishop-Sunland landfill by Brown's Maintenance and Supply and landfilled due to market glut and prohibitive transportation costs.
- High Grade Ledger Paper: Brown's Maintenance and Supply has a contract to collect this from some local business and governmental agencies.
- Plastic: The plastic collected is California Redemption Value only.
- Glass: The glass collected is California Redemption Value only.
- Metals: Aluminum cans are collected at all recycling centers in the County. Ferrous metals and tin cans are collected primarily by Brown's Maintenance and Supply.
- Food Waste: Some food waste is saved by local markets for farmers to feed their farm animals.
- Miscellaneous Organics: Some cooking fats and oils are collected by restaurants and shipped out of the County for reuse.
- Auto Bodies: Brown's Maintenance and Supply collects old auto bodies.



**CALIFORNIA INTEGRATED WASTE MANAGEMENT BOARD**

**LOCAL ASSISTANCE AND PLANNING COMMITTEE**

December 7, 1993

**AGENDA ITEM #3**

**ITEM:** Consideration of Adoption of Emergency Regulations Regarding: Revisions to Preparing the Content of Source Reduction and Recycling Elements (Article 6.2); New Regulations for Preparing the Content of Nondisposal Facility Elements (Article 6.4); and Revisions to the Procedures for Preparation, Adoption and Approval of the Source Reduction and Recycling Element, Household Hazardous Waste Element and the Nondisposal Facility Element (Article 7.0)

**BACKGROUND:**

Assembly Bill 440 (Sher, Stats. 1993, c. 1169), among other provisions, requires the Board to adopt emergency regulations no later than December 31, 1993, to facilitate implementation of the California Integrated Waste Management Act (Act), as amended by AB 2494 (Sher, Stats. 1992, c. 1292) and AB 3001 (Cortese, Stats. 1992, c. 1291), governing the preparation and submission of city, county and regional agency Source Reduction and Recycling Elements (SRREs) and city and county Nondisposal Facility Elements (NDFEs).

To facilitate the implementation of the Act, as amended, it is necessary that revisions be made to the California Code of Regulations (CCR) related to the content, preparation and approval of the city, county, and regional agency Source Reduction and Recycling Element (SRRE) and the Household Hazardous Waste Element (HHWE). Further, to facilitate implementation of the Act, as amended by AB 3001, new regulations are required to provide guidance for the preparation and approval of the city and county Nondisposal Facility Element (NDFE).

The following is a brief description of aforementioned legislation and the associated statutory changes to the Act:

AB 2494: (Sher, Stats. 1992, c. 1292)

Prior to the enactment of AB 2494, compliance with the solid waste diversion requirements was determined by tracking and quantifying the amount of waste diverted by the implementation of all diversion programs and by quantifying all disposal amounts. With the enactment of AB 2494, the Board and jurisdictions are required to use a disposal-based method of measurement in

determining achievement of the required diversion rates. Under the new system jurisdictions will measure tonnage disposed at disposal facilities and determine whether tonnage has been reduced by 25% and 50% as compared to their baseline waste generation rate.

Another change brought about by AB 2494 was a simplification of program reporting requirements in the SRRE. Prior to enactment of AB 2494, the SRRE was required to contain an explanation of how each of the SRRE component programs were to be monitored and evaluated during their implementation. The Act, as amended by AB 2494, requires that only those programs identified in the SRRE which involve recycling or composting and which are funded or operated by the jurisdiction must be monitored, evaluated and reported to the Board for market development purposes.

Finally, AB 2494 authorizes a city or county to form regional agencies to provide for regional implementation of the planning mandates.

AB 3001: (Cortese, Stats. 1992, c. 1291)

In 1992, the California Legislature enacted AB 3001. This statute requires every city and county to prepare and adopt a NDFE. A Nondisposal Facility is any solid waste facility required to obtain a solid waste facilities permit except, disposal facilities and transformation facilities. The city or county is required to describe and identify existing, expanded and new nondisposal facilities that a jurisdiction will utilize to reach the mandated goals.

AB 440: (Sher, Stats. 1993, c. 1169)

The Governor signed AB 440 as an urgency statute on October 11, 1993. As such, the provisions of AB 440 took effect immediately.

AB 440 makes significant changes in the way the SRRE and NDFE are submitted for Board approval. The statute now requires each jurisdiction to submit its SRRE and NDFE directly to the Board for approval according to a schedule based on the remaining permitted disposal capacity within the county of origin. This schedule is as follows:

Jurisdictions in counties with less than eight years capacity are required to submit their SRRE and NDFE to the Board by April 30, 1994 (144 jurisdictions).

Jurisdictions in counties with eight to fifteen years of disposal capacity are required to submit their SRRE and NDFE to the Board by August 31, 1994 (147 jurisdictions).

Jurisdictions in counties with fifteen or more years of disposal capacity are required to submit their SRRE and NDFE to the Board for approval by December 31, 1994 (219 jurisdictions).

AB 440 also removed the population ceiling of 250,000 citizens for the formation of regions for achievement of the diversion requirements of the Integrated Waste Management Act of 1989. This would allow urban, as well as rural jurisdictions, to form regional agencies. Under the provisions of AB 440, a regional agency may be the responsible agency for compliance with the planning and diversion requirements of the Act. Please note though, that jurisdictions which participate in a regional agency for the achievement of the diversion requirements will no longer be eligible for reductions in those requirements. If the Board has previously granted a jurisdiction who wishes to participate in a regional formation, such a reduction will no longer apply.

**ANALYSIS:**

Pursuant to AB 440 the Board is directed to adopt emergency regulations and submit them to the Office of Administrative Law (OAL) at the earliest feasible date, but no later than December 31, 1993. These regulations are needed to guide jurisdictions in their implementation of AB 2494 and AB 3001 for preparing, adopting and submittal for approval of their SRREs and their NDFEs. Jurisdictions are not required to revise their SRREs to comply with the requirements of AB 2494, prior to submittal to the Board for approval under AB 440.

Staff of the Governmental and Regulatory Assistance Division, Office of Local Assistance, in consultation with the other affected Board Divisions, Offices, and Board Member Advisors, have developed proposed emergency regulations to facilitate implementation of the Act as amended by AB 2494 (Sher), AB 3001 (Cortese) and AB 440 (Attached).

The regulations have been noticed for a 30-day public comment period. In accordance with the provisions of PRC section 40502 (AB 440), the subject regulations have been noticed by the OAL. As required, two public hearings have been held, one in Whittier on November 16th and one in Sacramento on November 19, 1993, in order to receive public comment on the regulations. In addition, a focused workshop was held on November 18, 1993 to discuss the proposed revisions to CCR 18776 (procedures for requesting diversion credit for waste type "sludge").

During the prescribed 30 day comment period on the proposed emergency regulations, Board staff received 28 written comments and approximately 53 oral communications. The Board staff

reviewed the public comments on the proposed regulations and have revised the regulations based on these comments.

An Initial Study and Negative Declaration were prepared pursuant to the California Environmental Quality Act (CEQA) and have been noticed for public comment.

**STAFF RECOMMENDATIONS:**

Staff recommends Committee adoption of the Initial Study and Negative Declaration. If these documents are adopted, staff recommends Committee adoption of the proposed emergency regulations for Article 6.2, 6.4, and 7.0 and forward the proposed regulations to the Board for consideration of approval at the December 15, 1993 meeting.

**ATTACHMENTS:**

1. Proposed Emergency Regulations / Article 6.2  
(SRRE Scope and Content)
2. Proposed Emergency Regulations / Article 6.4  
(NDFE Guidance)
3. Proposed Emergency Regulations / Article 7.0  
(procedures for preparation, adoption and approval of the SRRE, HHWE and NDFE)
4. Initial Study
5. Board Resolution 93-138
6. Board Resolution 93-137

Prepared by: Steve DeMello *S. DeMello* Phone 255-2667

Reviewed by: Dianne Range *DR* Phone 255-2304

Reviewed by: Judith J. Friedman *JJF* Phone 255-2303

Reviewed by: Dorothy Rice *D. Rice* Phone 255-2306

Legal Review: EB Date/Time 11/24/93 10:40 am.

**TITLE 14 CALIFORNIA INTEGRATED WASTE MANAGEMENT BOARD**

**Chapter 9. PLANNING GUIDELINES AND PROCEDURES FOR  
PREPARING AND REVISING COUNTYWIDE INTEGRATED  
WASTE MANAGEMENT PLANS**

**Article 6.2 Source Reduction and Recycling Elements**

**DETAILED ANALYSIS**

**Section**

18730	Scope
18731	Goals and Objectives
18732	Solid Waste Generation Analysis
18733	Model Component Format
18733.1	Component Objectives
18733.2	Existing Conditions Description
18733.3	Evaluation of Alternatives
18733.4	Selection of Program
18733.5	Program Implementation
18733.6	Monitoring and Evaluation
18734	Source Reduction Component: Specific Requirements
18734.1	Source Reduction Component Objectives
18734.2	Source Reduction Component Existing Conditions Description
18734.3	Evaluation of Source Reduction Program Alternatives
18735	Recycling Component Specific Requirements
18735.1	Recycling Component Objectives
18735.2	Recycling Component Program Existing Conditions Description
18735.3	Evaluation of Recycling Program Alternatives
18735.4	Selection of Recycling Program
18735.5	Recycling Program Implementation
18736	Composting Component Specific Requirements
18736.1	Composting Component Objectives
18736.2	Composting Component Program Existing Conditions Description
18736.3	Evaluation of Composting Program Alternatives
18736.4	Selection of Composting Program
18737	Special Waste Component
18737.1	Special Waste Component Objectives
18737.2	Special Waste Component Existing Conditions Description
18740	Education and Public Information Component
18744	<u>Solid Waste Disposal</u> Facility Capacity Component

1 18746 Funding Component  
2 18748 Integration Component  
3  
4

5 CHAPTER 9: PLANNING GUIDELINES AND PROCEDURES  
6 FOR PREPARING AND REVISING COUNTYWIDE  
7 INTEGRATED WASTE MANAGEMENT PLANS  
8  
9

10 ARTICLE 6.2: SOURCE REDUCTION AND RECYCLING ELEMENTS  
11  
12

13 Section 18730. Scope.  
14

15 (a) The Source Reduction and Recycling SRR Element (SRRE)  
16 shall specify the means by which each jurisdiction required to  
17 prepare and implement a SRR Element shall achieve the diversion  
18 mandates required by Public Resources Code section 41780 and  
19 41780.1.  
20

21 (b) The SRRE SRR Element shall include items identified in  
22 Chapter 9, Article 6.1, sections 18722 through 18726, and  
23 sections 18731 through 18749 of this Article, as applicable.  
24

25 (c) Unless otherwise specified, this Article pertains to  
26 initial and subsequent SRREs SRR Element.  
27

28 (d) For The purpose of this Article, a jurisdiction is a  
29 city, county, city and county or a regional agency.  
30

31 NOTE: Authority cited: Sections 40502 and ~~41824~~, Public  
32 Resources Code. Reference: Sections 40052, 40057, ~~40970-40975~~,  
33 41000, 41300, and 41780 and 41780.1, Public Resources Code.  
34  
35

36 Section 18731. Goals and Objectives.  
37

38 The SRRE SRR Element shall include statements which define the  
39 goals and objectives for the short-term and medium-term planning  
40 periods.  
41

42 (a) SRRE SRR Element goals shall be consistent with the  
43 mandates of section 40051 of the Public Resources Code.  
44

45 (b) SRRE SRR Element objectives shall identify the amount  
46 summarize the percentage of solid waste diversion which the  
47 jurisdiction plans to divert from disposal at disposal facilities  
48 to comply with the diversion requirements of Public Resource Code  
49 Sections 41780 and 41780.1 attain through each of the component  
50 programs described in sections 18733 through 18748 of this

1 Article.

2  
3 (c) SRRE ~~SRR-Element~~ objectives shall specify the time frame  
4 for achievement of each objective.  
5

6  
7 NOTE: Authority cited: Sections 40502 and ~~41824~~, Public  
8 Resources Code. Reference: Sections 40051, 40052, 40900(c),  
9 41001, and 41301, 41781.2 Public Resources Code.  
10

11  
12 **Section 18732. Solid Waste Generation Analysis.**  
13

14 Each jurisdiction preparing a SRRE ~~SRR-Element~~ shall prepare a  
15 solid waste generation analysis based upon the information  
16 developed in Article 6.1 of this Chapter. The analysis shall  
17 include, but not be limited to, the following:  
18

19 (a) For the initial SRRE ~~SRR-Element~~, include a A list, by  
20 specific waste categories, as denoted in section 18722, of  
21 Article 6.1 of this Chapter, of the quantities of materials  
22 currently diverted from disposal, and the materials identified as  
23 being currently disposed according to the Waste Generation Study  
24 conducted by the jurisdiction.  
25

26 (b) A list of the waste materials currently disposed in the  
27 jurisdiction which could potentially be diverted from disposal by  
28 use of the diversion programs described in sections 18733 through  
29 18740, of this Article.  
30

31 (c) A list of the waste materials currently disposed in the  
32 jurisdiction which cannot be diverted from disposal by diversion  
33 programs including, but not limited to, those described in  
34 sections 18733 through 18740, of this Article and a discussion of  
35 why these waste materials cannot be diverted from disposal.  
36

37 NOTE: Authority cited: Sections 40502 and ~~41824~~, Public  
38 Resources Code. Reference: Sections 41030, 41051, 41071, 41201,  
39 41330, 41351, 41371, and 41401, Public Resources Code.  
40

41  
42 **Section 18733. Model Component Format.**  
43

44 (a) The model component format, described in sections  
45 18733.1 through 18733.6 of this Article, shall be used in the  
46 preparation of each of the following individual components of the  
47 SRRE ~~SRR-Element~~:  
48

- 49 (1) Source Reduction Component  
50 (2) Recycling Component

- 1 (3) Composting Component  
2 (4) Special Waste Component  
3

4 (b) Additional requirements contained in sections 18734  
5 through 18738.5 of this Article, shall be included in the  
6 preparation of the components, listed in section 18733(a) of this  
7 Article, in accordance with the model component format.  
8

9 NOTE: Authority cited: Sections 40502 and ~~41824~~, Public  
10 Resources Code. Reference: Sections 41003 and 41303, Public  
11 Resources Code.  
12  
13

14 **Section 18733.1. Component Objectives.**  
15

16 (a) Each component shall state the specific objectives to be  
17 accomplished during the short-term and medium-term planning  
18 periods. The initial SRRE ~~SRR-Element~~ component objectives shall  
19 be based upon the results of the Solid Waste Generation Analysis  
20 required by section 18732 of this Article and other local  
21 considerations which may be necessary to accomplish integrated  
22 waste management.  
23

24 (b) For the initial SRRE ~~SRR-Element~~, Each jurisdiction  
25 shall identify specific waste categories or waste types, as found  
26 in the Solid Waste Generation Study conducted pursuant to section  
27 18722, of Article 6.1 of this Chapter, as priorities for waste  
28 diversion based on analysis of solid waste generation in terms of  
29 criteria which may include, but are not limited to, the  
30 following:  
31

- 32 (1) volume of the solid waste;  
33  
34 (2) weight of the solid waste;  
35  
36 (3) hazard of the solid waste; and  
37  
38 (4) material, products or packages, contributing to the  
39 waste category or waste type, that are made of non-renewable  
40 resources.  
41

42 NOTE: Authority cited: Sections 40502 and ~~41824~~, Public  
43 Resources Code. Reference: Sections 41054, 41071, 41201, 41351,  
44 41371 and 41401, Public Resources Code.  
45  
46

47 **Section 18733.2. Existing Conditions Description.**  
48

49 (a) As applicable, each component, listed in section  
50 18733(a) of this Article, shall include a description of the

1 existing diversion alternatives for each component program in the  
2 jurisdiction. The description shall include, but not be limited  
3 to, the following:

- 4  
5 (1) a brief description of each existing diversion  
6 alternative implemented in the jurisdiction; and  
7  
8 (2) the quantity of waste diverted, listed by waste  
9 category and waste type where applicable as follows:  
10 ~~for each existing diversion alternative described.~~  
11 ~~Waste quantities shall be specified by volume,~~  
12 ~~expressed in cubic yards, or by weight, expressed in tons,~~  
13 ~~and~~

14  
15 (A) for the initial SRRE SRR Element identify the quantity  
16 of waste diverted for each existing diversion  
17 alternative. Waste quantities shall be specified by  
18 volume, expressed in cubic yards, or by weight,  
19 expressed in tons;

20  
21 (B) for a subsequent SRRE SRR Element, quantify each  
22 existing diversion alternative which involves recycling  
23 or composting programs that are operated or funded by a  
24 jurisdiction. Waste quantities shall be specified by  
25 volume, expressed in cubic yards, or by weight,  
26 expressed in tons;

27  
28  
29 (3) an identification and description of the existing  
30 diversion alternatives within the jurisdiction that  
31 will be decreased in scope, phased out or closed during  
32 the short-term and medium-term planning periods. The  
33 description shall include a discussion of the effects  
34 of such closure on existing solid waste management  
35 activities within the jurisdiction and its impact on  
36 the attainment of the solid waste diversion mandates  
37 specified in section 41780 and section 41780.1, Public  
38 Resources Code.

39  
40 (b) The information provided in this section shall be used  
41 ~~to support quantification of existing diversion alternatives to~~  
42 ~~determine the current percentage.~~

43  
44 (1) account for existing diversion amounts when calculating  
45 baseyear solid waste generation rates in the initial SRRE SRR  
46 Element, and

47  
48 (2) determining the maximum allowable disposal rates for  
49 subsequent SRREs SRR Element as set forth in sections 41780 and  
50 41780.1, Public Resources Code.

1 NOTE: Authority cited: Sections 40502 and 41824, Public  
2 Resources Code. Reference: Section 41031, 41333, 41780.2, 40901  
3 Section 41781(a), Public Resources Code.  
4  
5

6 Section 18733.3. Evaluation of Alternatives.  
7

8 Each component shall include an evaluation of diversion  
9 alternatives which have been considered for local implementation  
10 for the purpose of achieving the objectives required in section  
11 18733.1, of this Article.  
12

13 (a) Each alternative considered shall be evaluated in terms  
14 of the following criteria and any other local considerations:  
15

16 (1) effectiveness in reducing either solid waste  
17 volume, weight, percentage in weight or its volumetric  
18 equivalent;

19 (2) hazard created by the alternative considered;  
20

21 (3) ability to accommodate changing economic,  
22 technological, and social conditions;  
23

24 (4) consequences of the diversion alternative on the  
25 characterized waste, such as shifting solid waste generation  
26 from one type of solid waste to another;  
27

28 (5) whether it can be implemented in the short-term and  
29 medium-term planning periods; and  
30

31 (6) the need for expanding existing facilities or building  
32 new facilities to support implementation of the alternative.  
33

34 (b) In addition, the evaluation shall include, but not be  
35 limited to, the following:  
36

37 (1) a discussion of the consistency of each alternative with  
38 applicable local policies, plans, and ordinances based upon  
39 local conditions;  
40

41 (2) a discussion of any institutional barriers to local  
42 implementation of each alternative;  
43

44 (3) an estimate of the costs related to the implementation  
45 of each alternative being evaluated for the short-term and  
46 medium-term planning periods; and  
47

48 (4) a discussion of the availability of local, regional,  
49 state, national, and international end-uses for the  
50 materials which would be diverted through implementation of

1 each alternative being considered.  
2  
3

4 NOTE: Authority cited: Sections 40502 and ~~41824~~, Public  
5 Resources Code. Reference: Sections 40900(c), 41053, 41073,  
6 41203, 41250, 41280, 41353, 41373, 41403, 41450, and 41480, and  
7 41781.1, Public Resources Code.  
8  
9

10 **Section 18733.4. Selection of Program.**  
11

12 Each component shall identify and describe the diversion  
13 alternatives selected, including existing diversion alternatives,  
14 expansions of existing diversion alternatives, and new diversion  
15 alternatives, which will be implemented to meet the objectives of  
16 the component and meet the solid waste diversion requirements  
17 specified in Public Resources Code, sections 41780 and 41780.1.  
18 This selection shall be based upon the evaluations conducted  
19 pursuant to section 18733.3 of this Article. The program  
20 description shall include, but not be limited to, the following:  
21

22 (a) a discussion of each diversion alternative selected for  
23 the program identifying why the alternative was selected for  
24 implementation. For the initial SRRE SRR-Element T this discussion  
25 shall be based upon the data compiled in the solid waste  
26 generation study conducted pursuant to Article 6.1, of this  
27 Chapter, information contained in the solid waste generation  
28 analysis required by section 18732 of this Article; and the  
29 evaluation conducted pursuant to section 18733.3 of this Article.  
30

31 (b) an estimate of the anticipated quantities of solid  
32 wastes to be diverted from solid waste disposal, by diversion  
33 program and waste type, for the short-term and medium-term  
34 planning periods. Solid waste quantities shall be estimated  
35 either by volume, expressed in cubic yards, or by weight,  
36 expressed in tons. Each component shall state the anticipated  
37 percentage of contribution of the selected program towards the  
38 diversion mandates required by section 41780 and 41780.1 of the  
39 Public Resources Code;  
40

41 (c) as applicable to the component, a listing of the  
42 anticipated local, regional, state, national, and/or  
43 international end-uses for diverted materials based upon the  
44 evaluation of the diversion alternative required by section  
45 18733.3(b)(4) of this Article;  
46

47 (d) as applicable to the component, a description of the  
48 proposed methods for handling and disposal which may be necessary  
49 to implement the selected program; and  
50

1 (e) a description of any facilities to be utilized for the  
2 implementation of the program which section 18733.3 of this  
3 Article has shown must be expanded or built to support  
4 implementation of the selected program.  
5

6 (f) Each diversion alternative which involves waste type  
7 "sludge" shall, in addition to the criteria set forth in  
8 subsections (a) and (b) of this section, be subject to a finding  
9 by the Board as described in Article 7.0 section 18776.  
10

11  
12 NOTE: Authority cited: Sections 40502 and ~~41824~~, Public  
13 Resources Code. Reference: Sections 40900(c), 41050 through  
14 41053, 41070 through 41075, 41200 through 41204, 41250, 41280,  
15 41350 through 41353, 41370 through 41375, 41400 through 41404,  
16 41450, and 41780 and 41780.1, Public Resources Code.  
17

#### 18 19 **Section 18733.5. Program Implementation.**

20  
21 Each component shall contain a program implementation description  
22 which includes, but is not limited to, the following:  
23

24 (a) identification of government agencies and divisions  
25 thereof, organizations, and/or persons responsible for  
26 implementation of the selected program;  
27

28 (b) identification of the tasks necessary to implement the  
29 selected program;  
30

31 (c) identification of a short-term and medium-term planning  
32 period implementation schedule addressing each task identified in  
33 (b) of this section; and  
34

35 ~~(d) identification of known program implementation costs,~~  
36 ~~including public and private costs, revenues, and revenue sources~~  
37 ~~necessary for implementation of the selected program.~~  
38

39 NOTE: Authority cited: Sections 40502 and ~~41824~~, Public  
40 Resources Code. Reference: Sections 40900(c), 41050, 41070,  
41 41200, 41250, 41280, 41350, 41370, 41400, 41450, 41480, and  
42 41780, Public Resources Code.  
43

#### 44 45 **Section 18733.6. Monitoring and Evaluation.**

46  
47 Each recycling or composting component program that is operated  
48 or funded by a jurisdiction shall contain an explanation of how  
49 the program is to be monitored and evaluated during its  
50 implementation as follows:

1 (a) identify the methods to quantify and monitor achievement  
2 of the objectives, including but not limited to, diversion from  
3 solid waste landfills and transformation facilities and reduction  
4 of waste hazards. Actual solid waste diversion shall be  
5 quantified either by volume, expressed in cubic yards, or by  
6 weight, expressed in tons, and as a percentage of the total solid  
7 waste generation of the jurisdiction.

8  
9 (b) each jurisdiction shall use one or more of the following  
10 methods to monitor and evaluate diversion programs being  
11 implemented ~~and to evaluate whether the programs will assure~~  
12 ~~compliance with the mandated diversion requirements:~~

13  
14 (1) for the initial SRRE SRR Element, a Waste Generation  
15 Study consistent with the waste generation study prepared  
16 under section 18722, of Article 6.1 of this Chapter;

17  
18  
19 (2) targeted solid waste characterization studies involving  
20 ~~all or a representative sample of generator sites and~~  
21 recycling, composting, transformation, and solid waste  
22 landfill facilities to measure changes in the volume,  
23 weight and hazard of specific materials, ~~with adjustments~~  
24 ~~for shifts in solid waste generation caused by source~~  
25 ~~reductions;~~

26  
27 (3) an assessment of any changes in the design, production,  
28 distribution, sale, and/or use of selected products and  
29 packages which affect solid waste generation; or

30  
31 (4) another method for which prior written approval has  
32 been given by the Board.

33  
34 (c) Each jurisdiction shall provide the following  
35 information based upon the specific monitoring and evaluation  
36 methods selected for each recycling and composting program that  
37 is operated or funded by a jurisdiction program:

38  
39 (1) written criteria for evaluating the program's  
40 effectiveness;

41  
42 (2) identification of agencies or divisions thereof,  
43 organizations, and/or persons responsible for the program's  
44 monitoring, evaluation, and reporting;

45  
46 ~~(3) identification of known monitoring and evaluation~~  
47 ~~funding requirements, revenues, and revenue sources, and~~

48  
49 ~~(4)~~ (3) identification of measures to be implemented if  
50 monitoring shows a shortfall in the attainment of solid

1 waste diversion objectives off the component or as shortfall  
2 in the attainment off the diversion mandates specified in  
3 Public Resources Code, section 417800 and 417800.1. Such  
4 measures may include, but are not limited to, provisions  
5 for:

6  
7 (A) increasing the frequency of program monitoring and  
8 review, or;

9  
10 (B) modification of the objectives or diversion alternatives  
11 adopted in each component program.

12  
13 NOTE: Authority cited: Sections 405022 and 41824, Public  
14 Resources Code. Reference: Sections 40901, 41052, 41072, 41202,  
15 41250, 41280, 41352, 41372, 41402, 41450, and 41780, and 41780.1  
16 Public Resources Code.

17  
18  
19  
20  
21 **Section 18734. Source Reduction Component Specific Requirements.**

22  
23 The Source Reduction Component shall include the requirements  
24 contained in sections 18733 through 18734.3 of this Article.

25  
26 NOTE: Authority cited: Sections 405022 and 41824, Public  
27 Resources Code. Reference: Sections 41050 and 41350, Public  
28 Resources Code.

29  
30  
31 **Section 18734.1. Source Reduction Component Objectives.**

32  
33 (a) Each jurisdiction shall examine and select source  
34 reduction program objectives which meet the goal of minimizing  
35 the quantity of solid waste disposed generated, based upon data  
36 generated in the Solid Waste Generation Study conducted pursuant  
37 to section 18722 of Article 6.1 of this Chapter, including, but  
38 not limited to, the following:

39  
40 (1) reducing the use of non-recyclable materials;

41  
42 (2) replacing disposable materials and products with  
43 reusable materials and products;

44  
45 (3) reducing packaging;

46  
47 (4) reducing the amount of yard waste generated;

48  
49 (5) purchasing repairable products; and  
50

1 (6) increasing the efficiency of the use of paper,  
2 cardboard, glass, metal, and other materials by reducing  
3 wastes from non-residential generators' production  
4 operations, processes, and equipment and considering  
5 durability, reusability, and recyclability as product  
6 selection criteria.

7  
8 (b) Each jurisdiction shall identify specific waste types  
9 (materials, products, and packaging) to be targeted for the  
10 source reduction objectives, based upon criteria, which include,  
11 but are not limited to, the following:

12  
13 (1) the potential to extend the useful life of affected  
14 materials, products, or packaging; and

15  
16 (2) whether the waste type has limited recyclability.

17  
18 (3) whether the disposal of a certain waste type may  
19 contain material which may cause an adverse environmental  
20 impact.

21  
22  
23 NOTE: Authority cited: Sections 40502 and ~~41824~~, Public  
24 Resources Code. Reference: Sections 40900(c), 41050 through 41054  
25 and 41350 through 41354, Public Resources Code.

26  
27  
28 **Section 18734.2. Source Reduction Component Existing Conditions**  
29 **Description.**

30  
31 (a) The description of existing conditions shall identify  
32 the source reduction activities currently being performed by  
33 public and private entities including, but not limited to  
34 governmental, commercial, and industrial entities;

35  
36 (b) For the initial SRRE SRR-Element, Quantification of  
37 current source reductions achieved through existing programs  
38 within the jurisdiction shall meet the following criteria:

39  
40 (1) the methodology, assumptions, and results shall be  
41 described, documented, and verified; and

42  
43 (2) the jurisdiction shall use the best readily available  
44 and applicable data, which may include direct observations  
45 and measurements of source reduction and the results of  
46 monitoring programs similar to those identified in section  
47 18733.6 of this Article.

48  
49 NOTE: Authority cited: Sections 40502 and ~~41824~~, Public  
50 Resources Code. Reference: Sections 41050, 41053, 41350 and

1 41353, Public Resources Code.

2  
3  
4 **Section 18734.3. Evaluation of Source Reduction Program**  
5 **Alternatives.**  
6

7 Each jurisdiction shall consider source reduction ~~diversion~~  
8 program alternatives including, but not limited to, the  
9 following:

10  
11 (a) Rate structure modifications, which may include, but  
12 are not limited to:

13  
14 (1) local waste disposal fee modifications;

15  
16 (2) quantity-based local user fees, which may include, but  
17 are not limited to, variable can rates for garbage  
18 collection services, such as fees based on the number of  
19 containers set out for collection;

20  
21 (b) Creation of other economic incentives, which may  
22 include, but are not limited to:

23  
24 (1) loans, grants, and loan guarantees;

25  
26 (2) deposits, refunds, and rebates; and

27  
28 (3) reduced business license fees;

29  
30 (c) Technical assistance or instructional and promotional  
31 alternatives, which may include, but are not limited to:

32  
33 (1) waste evaluations;

34  
35 (2) the establishment of compost programs which assist  
36 generators to compost at the site of generation;

37  
38 (3) technical assistance to industry and consumer  
39 organizations, and to source reduction businesses;

40  
41 (4) educational efforts, such as consumer awareness  
42 programs, school curricula development, seminars, and public  
43 forums;

44  
45 (5) awards and other types of public recognition for source  
46 reduction activities; and

47  
48 (6) non-procurement source reduction programs, such as  
49 education of employees, office changes to increase the use  
50 of scrap paper, increased use of electronic mail, and

1 increased double-sided copying.

2  
3 (d) Regulatory programs, which may include, but are not  
4 limited to:

5  
6 (1) local adoption of ordinances that specify that one or  
7 more of the following criteria be considered in the  
8 procurement selection of products and packaging by the  
9 jurisdiction:

10  
11 (A) durability

12  
13 (B) recyclability

14  
15 (C) reusability

16  
17 (D) recycled material content

18  
19 (2) local establishment of incentives and disincentives to  
20 land-use development that promote source reduction;

21  
22 (3) locally established requirements of waste reduction  
23 planning and reporting by waste generators or manufacturers;

24  
25 (4) local adoption of bans on products and packaging to the  
26 extent the following can be demonstrated:

27  
28 (A) the ban will result in reduction in waste at the  
29 source, rather than substitution by another product or  
30 package of equivalent or greater volume; or and

31  
32 (B) the ban will result in a net environmental benefit.

33  
34 NOTE: Authority cited: Sections 40502 and ~~41824~~, Public  
35 Resources Code. Reference: Sections 41050 through 41054 and  
36 41350 through 41354, Public Resources Code.

37  
38  
39 **Section 18735. Recycling Component Specific Requirements.**

40  
41 The Recycling Component shall include the requirements contained  
42 in sections 18733.1 through 18733.6 and 18735.1 through 18735.5  
43 of this Article.

44  
45 NOTE: Authority cited: Sections 40502 and ~~41824~~, Public  
46 Resources Code. Reference: Sections 41070 and 41370, Public  
47 Resources Code.

48  
49  
50 **Section 18735.1. Recycling Component Objectives.**

1 A statement of market development objectives to be achieved in  
2 the short-term and medium-term planning periods shall be included  
3 in the goals and objectives section of the recycling component,  
4 as required by sections 41074 and 41374 of the Public Resources  
5 Code.  
6

7 NOTE: Authority cited: Sections 40502 and ~~41824~~, Public  
8 Resources Code. Reference: Sections 41070 through 41074 and  
9 41370 through 41374, Public Resources Code.  
10

11 **Section 18735.2. Recycling Component Program Existing Conditions**  
12 **Description.**  
13

14 The description of the existing recycling program shall include,  
15 but not be limited to, a description of existing private and  
16 public recycling activities, local market development activities,  
17 including any government procurement programs, economic  
18 development activities, consumer incentives, and education  
19 programs conducted within the jurisdiction.  
20

21 NOTE: Authority cited: Sections 40502 and ~~41824~~, Public  
22 Resources Code. Reference: Sections 41070 and 41370, Public  
23 Resources Code.  
24  
25  
26  
27  
28

29 **Section 18735.3. Evaluation of Recycling Program Alternatives.**  
30

31 Each jurisdiction shall analyze the recycling diversion  
32 alternatives affecting residential, commercial, and industrial  
33 wastes. The analysis shall take into account existing recycling  
34 programs and their possible expansion. ~~The advantages and~~  
35 ~~disadvantages of public versus private ownership or operation of~~  
36 ~~recycling programs and facilities shall be addressed~~ in addition  
37 to the areas of concern specified in section 18733.3 of this  
38 Article.  
39

40 (a) The alternatives shall include, but not be limited to,  
41 the following methods for accomplishing separation of the  
42 recyclable materials from the waste stream:  
43

44 (1) separation of recyclable materials at the source of  
45 generation, including curbside and mobile collection  
46 systems;  
47

48 (2) drop-off recycling centers;  
49

50 (3) buy-back recycling centers;

1 (4) manual material recovery operations;  
2

3 (5) mechanized material recovery operations that produce a  
4 product which has a market; and ---  
5

6 (6) salvage at solid waste facilities.  
7  
8

9 (b) The jurisdiction shall consider changing zoning and  
10 building code practices to encourage recycling of solid wastes,  
11 such as, rezoning to allow siting of a drop-off recycling center  
12 in residential neighborhoods or revising building codes to  
13 require adequate space be allotted in new construction for  
14 interim storage of source-separated materials.  
15

16 (c) The jurisdiction shall consider changing existing rate  
17 structures to encourage recycling of solid wastes.  
18

19 (d) The jurisdiction shall consider the methods which it  
20 will use to increase the markets for recycled materials,  
21 including, but not limited to, changing governmental procurement  
22 programs to promote market development by giving purchase  
23 preferences to recycled products or otherwise specifying their  
24 use.  
25

26 (e) The jurisdiction shall encourage handling methods which  
27 preserve the integrity of recovered materials so that they remain  
28 usable raw materials for manufacturers of recycled content  
29 products. For this purpose, the jurisdiction shall consider the  
30 extent to which separation of recyclable materials from waste can  
31 be performed as close to the point of generation as possible.  
32

33 NOTE: Authority cited: Sections 40502 and ~~41824~~, Public  
34 Resources Code. Reference: Sections 40900(d), 41075 and 41375,  
35 Public Resources Code.  
36  
37

#### 38 **Section 18735.4. Selection of Recycling Program.** 39

40 (a) The Recycling Component shall identify the end markets  
41 or end users which will be secured during the short-term period,  
42 for the materials collected. In the event that such markets  
43 cannot be identified, the component shall describe the methods by  
44 which the jurisdiction will secure the necessary markets.  
45

46 (1) The identification of markets may be described in  
47 general terms.  
48

49 (2) Planned development of markets at manufacturing  
50 facilities in the jurisdiction shall also be described.

1 (b) The Recycling Component shall describe the measures to  
2 be taken if un-economical market conditions or other unfavorable  
3 conditions occur which are beyond the jurisdiction's control and  
4 which would prevent the jurisdiction from satisfying the  
5 requirements of section 41780 and 41780.1 of the Public Resource  
6 Code.

7  
8 NOTE: Authority cited: Sections 40502 ~~and 41824~~, Public  
9 Resources Code. Reference: Sections 41074, and 41374, Public  
10 Resources Code.

11  
12 **Section 18735.5. Recycling Program Implementation.**

13  
14 The recycling program shall denote actions planned to deter  
15 unauthorized removal of recyclable materials which would  
16 adversely affect the recycling program's effectiveness.

17  
18 NOTE: Authority cited: Sections 40502 ~~and 41824~~, Public  
19 Resources Code. Reference: Sections 41070 and 41370, Public  
20 Resources Code.

21  
22 **Section 18736. Composting Component Specific Requirements.**

23  
24 The Composting Component shall include the requirements contained  
25 in sections 18733.1 through 18733.6 and 18736.1 through 18736.4  
26 of this Article.

27  
28 NOTE: Authority cited: Sections 40502 ~~and 41824~~, Public  
29 Resources Code. Reference: Sections 41200 and 41400, Public  
30 Resources Code.

31  
32 **Section 18736.1 Composting Component Objectives**

33  
34 A statement of market development objectives to be achieved in  
35 the short-term and medium-term planning periods shall be provided  
36 in the Composting Component, as required by sections 41204 and  
37 41404 of the Public Resources Code.

38  
39 NOTE: Authority cited: Sections 40502 ~~and 41824~~, Public  
40 Resources Code. Reference: Sections 41200 and 41400, Public  
41 Resources Code.

42  
43  
44 **Section 18736.2. Composting Component Program Existing**  
45 **Conditions Description.**

46  
47 The description of the existing composting program shall include,  
48 but not be limited to, a description of existing local market  
49 development activities, including any government procurement  
50 programs, economic development activities, or consumer incentives

1 conducted within the jurisdiction.  
2

3 NOTE: Authority cited: Sections 40502 and ~~41824~~, Public  
4 Resources Code. Reference: Sections 41200 and 41400, Public  
5 Resources Code.  
6

7  
8 **Section 18736.3. Evaluation of Composting Program Alternatives.**  
9

10 (a) Composting program alternatives that qualify toward  
11 achievement of the diversion mandates specified in section 41780  
12 of the Public Resources Code shall include only those  
13 alternatives whose products result from the controlled biological  
14 decomposition of organic wastes that are source separated from  
15 the municipal solid waste stream or separated at a centralized  
16 waste processing facility.  
17

18 (b) Composting alternatives do not include composting of  
19 solid waste at the site of generation by the generator, since  
20 such an alternative constitutes a source reduction method.  
21

22  
23 NOTE: Authority cited: Sections 40502 and ~~41824~~, Public  
24 Resources Code. Reference: Sections 41201, 41202, 41401 and  
25 41402, Public Resources Code.  
26

27  
28 **Section 18736.4. Selection of Composting Program.**  
29

30 (a) The Composting Component shall identify the end markets  
31 or end use which will be secured during the short-term period for  
32 the materials composted, using the selected program. In the event  
33 that such markets cannot be firmly identified, the component  
34 shall describe the methods by which the jurisdiction will secure  
35 the necessary markets. The identification of markets may be  
36 described in general terms. Planned development of markets at  
37 manufacturing facilities in the jurisdiction shall also be  
38 described.  
39

40 (b) The Composting Component shall describe the measures to  
41 be taken if un-economical market conditions occur beyond the  
42 jurisdiction's control, which would prevent the jurisdiction from  
43 satisfying the requirements of section 41780 and 41780.1 of the  
44 Public Resource Code.  
45

46 NOTE: Authority cited: Sections 40502 and ~~41824~~, Public  
47 Resources Code. Reference: Sections 41200, 41204, 41400, and  
48 41404, Public Resources Code.  
49  
50

1     **Section 18737. Special Waste Component.**

2  
3     The Special Waste Component shall include the requirements  
4     contained in sections 18733.1 through 18733.6 and 18737.1 and  
5     18737.2 of this Article.

6  
7     NOTE: Authority cited: Sections 40502 and ~~41824~~, Public  
8     Resources Code. Reference: Sections 40900(c), 41250 and 41450,  
9     Public Resources Code.

10  
11  
12     **Section 18737.1. Special Waste Component Objectives.**

13  
14     For the initial SRRE SRR-Element Each jurisdiction shall examine  
15     and select Special Waste Component objectives based upon data  
16     generated in the Solid Waste Generation Study, conducted pursuant  
17     to section 18722, of Article 6.1 of this Chapter. The objectives  
18     shall include a plan to reduce the hazard potential of special  
19     wastes by waste type.

20  
21     NOTE: Authority cited: Sections 40502 and ~~41824~~, Public  
22     Resources Code. Reference: Sections 40900(c), 41250 and 41450,  
23     Public Resources Code.

24  
25  
26     **Section 18737.2. Special Waste Component Existing Conditions**  
27     **Description.**

28  
29     (a) The description of the existing special waste program  
30     shall include, but not be limited to, a description of existing  
31     solid waste facilities which are permitted to handle or dispose  
32     of special wastes. Where applicable, the description shall  
33     include a discussion of other regulatory agency requirements,  
34     permits, or other documents associated with the operation of  
35     these facilities.

36  
37     (1) regulatory agencies include, but are not limited to,  
38     regional water quality control boards, air quality  
39     management districts, and the ~~Department of Health Services~~  
40     Department of Toxics Substances Control.

41  
42     (b) for the initial SRRE SRR-Element the jurisdiction shall  
43     provide a discussion on those special wastes identified in the  
44     Waste Generation Study conducted pursuant to section 18722, of  
45     Article 6.1 of this Chapter for which there is currently no  
46     permitted handling or disposal method within the jurisdiction.

47  
48     NOTE: Authority cited: Sections 40502 and ~~41824~~, Public  
49     Resources Code. Reference: Sections 41250 and 41450, Public  
50     Resources Code.

1     **Section 18740. Education and Public Information Component.**  
2

3         (a) Component objectives. The Education and Public  
4     Information Component shall include a statement of educational  
5     and informational objectives for the short-term and medium-term  
6     planning periods.  
7

8         (b) Existing program description. The component shall  
9     include a description of all existing educational and public  
10    information programs and activities within the jurisdiction which  
11    promote source reduction, recycling, composting, and the safe  
12    handling and disposal of solid waste.  
13

14        (c) Selection of program alternatives. For the initial SRRE  
15    ~~SRRE Element~~ The component shall incorporate data compiled in the  
16    solid waste generation study conducted pursuant to Article 6.1  
17    and the solid waste generation analysis of section 18732 of this  
18    Article to identify solid waste generators that will be targeted  
19    in educational and public information programs.  
20

21  
22        (d) Program implementation. The component shall include a  
23    program implementation discussion which:  
24

25        (1) identifies those agencies or divisions thereof,  
26        organizations, and/or persons responsible for  
27        implementation;  
28

29        (2) identifies required implementation tasks;  
30

31        (3) establishes short-term and medium-term implementation  
32        schedules for tasks;  
33

34        ~~(4) identifies all public and private program implementation~~  
35        ~~costs, revenues, and revenue sources necessary for program~~  
36        ~~implementation.~~  
37

38        (e) Monitoring and evaluation. For each component program  
39    which involves recycling or composting programs that are operated  
40    or funded by a jurisdiction, The component shall:  
41

42        (1) identify the methods to be used to measure achievement  
43        of the education and public information objectives  
44        identified pursuant to section (a), above;  
45

46        (2) establish written criteria by which to evaluate program  
47        effectiveness;  
48

49        (3) identify agencies or divisions thereof, organizations,  
50        and/or persons responsible for program monitoring,

1 evaluation, and reporting;

2  
3 ~~(4) identify monitoring and evaluation funding requirements,~~  
4 ~~revenues, and revenue sources;~~

5  
6 ~~(5)~~ (4) identify measures to be implemented if monitoring  
7 performed pursuant to section 18733.6 (a) of this Article  
8 shows a shortfall in the attainment of the solid waste  
9 diversion objectives; and

10  
11 ~~(6)~~ (5) establish a program monitoring and reporting  
12 schedule.

13  
14 NOTE: Authority cited: Sections 40502 and ~~41824~~, Public  
15 Resources Code. Reference: Sections 40901, 41220 and 41420,  
16 Public Resources Code.

17  
18  
19 **Section 18744. Disposal Solid Waste Facility Capacity Component.**

20  
21 (a) ~~For the initial SRRE SRR Element~~ The Solid Waste  
22 ~~disposal~~ Facility Capacity Component shall identify and describe  
23 all existing permitted solid waste landfills and transformation  
24 facilities within the jurisdiction. This description shall  
25 contain the following:

26  
27 (1) identification of the owner and operator of each  
28 permitted solid waste disposal facility;

29  
30 (2) quantity and waste types of solid waste disposed;

31  
32 (3) permitted site acreage;

33  
34 (4) permitted capacity;

35  
36 (5) current disposal fees; and

37  
38 (6) for solid waste landfills, remaining facility capacity  
39 in cubic yards and years.

40  
41 (b) The Solid Waste ~~disposal~~ Facility Capacity Component  
42 shall include a solid waste disposal facility needs projection  
43 which estimates the additional disposal capacity, in cubic yards  
44 per year, needed to accommodate anticipated solid waste  
45 generation within the jurisdiction for a 15-year period  
46 commencing in 1991.

47  
48 (1) The solid waste disposal facility capacity needs  
49 projection for the initial SRRE SRR Element shall be calculated  
50 based upon the solid waste generation projection conducted in

1 accordance with section 18722, of Article 6.1 of this Chapter.

2  
3 (2) The disposal capacity needs projection for the 15 year  
4 period shall be calculated using the following equation:

5  
6  
7 
$$\text{ADDITIONAL CAPACITY}_{\text{Year } n} = [(G + I) - (D + TC + LF + E)]_{\text{Year } n}$$

8  
9 where:

10  
11 G = The amount of solid waste projected to be generated in the  
12 jurisdiction;

13  
14 I = The amount of solid waste which is expected to be imported  
15 to the jurisdiction for disposal in permitted solid waste  
16 disposal facilities through interjurisdictional agreement(s)  
17 with other cities or counties, or through agreements with  
18 solid waste enterprises, as defined in section 40193 of the  
19 Public Resources Code.

20  
21 D = The amount diverted through successful implementation of  
22 proposed source reduction, recycling, and composting  
23 programs.

24  
25  
26 TC = The amount of volume reduction occurring through available,  
27 permitted transformation facilities.

28  
29 LF = The amount of permitted solid waste disposal capacity which  
30 is available for disposal in the jurisdiction, of solid  
31 waste generated in the jurisdiction.

32  
33 E = The amount of solid waste generated in the jurisdiction  
34 which is exported to solid waste disposal facilities through  
35 interjurisdictional agreement(s) with other cities,  
36 counties or states, or through agreements with solid waste  
37 enterprises, as defined in section 40193 of the Public  
38 Resources Code.

39  
40 n = each year of a 15 year period commencing in 1991. [iterative  
41 in one year increments]

42  
43 (c) The Solid Waste ~~disposal~~ Facility Capacity Component  
44 shall include discussions of:

45  
46 (1) The solid waste disposal facilities within the  
47 jurisdiction which will be phased out or closed during the  
48 short-term and medium-term planning periods and the  
49 anticipated effect from such phase-out or closure on  
50 disposal capacity needs of the jurisdiction.

1 (2) Plans to establish new or expanded facilities for the  
2 short-term and medium-term planning periods and the  
3 projected additional capacity of each new or expanded  
4 facility.

5  
6 (3) Plans to export waste to another jurisdiction for the  
7 short-term and medium-term planning periods and the  
8 projected additional capacity of proposed export agreements.  
9

10  
11 NOTE: Authority cited: Sections 40502 and ~~41824~~, Public  
12 Resources Code. Reference: Sections 41260, 41460, 41730-41736 and  
13 41821, Public Resources Code.  
14

15  
16 **Section 18746. Funding Component.**

17  
18 (a) The Funding Component shall demonstrate that there is  
19 sufficient funding and allocation of resources for:  
20

21 (1) program planning and development;

22  
23 (2) implementation of programs in order to comply with the  
24 requirements of section 41780 and 41780.1 of the Public  
25 Resources Code.  
26

27 (b) The Funding Component shall provide cost estimates for  
28 component programs scheduled for implementation in the short-term  
29 planning period.  
30

31 (1) The Funding Component shall identify revenue sources  
32 sufficient to support the component programs.  
33

34 (2) The Funding Component shall identify sources of  
35 contingency funding for component programs.  
36

37 NOTE: Authority cited: Sections 40502 and ~~41824~~, Public  
38 Resources Code. Reference: Sections 41230 and 41430, Public  
39 Resources Code.  
40

41  
42  
43  
44 **Section 18748. Integration Component.**

45  
46 (a) The Integration Component shall explain how the Source  
47 Reduction, Recycling, Composting, and Special Waste components  
48 combine to achieve the 25% and 50% mandates specified in Public  
49 Resources Code section 41780 and 41780.1. The Integration  
50 component shall include, but is not limited to, the following:

1 (1) a description of the solid waste management practices  
2 which fulfill the legislative goals of promoting integrated  
3 solid waste management in the following order of priority:

4  
5 (A) source reduction;

6  
7 (B) recycling and composting; and

8  
9 (C) environmentally safe transformation and environmentally  
10 safe land disposal of solid wastes;

11  
12 (2) an explanation of how the jurisdiction has integrated  
13 the components to maximize the use of all feasible source  
14 reduction, recycling and composting options;

15  
16 (3) an explanation of how the components jointly achieve  
17 the diversion mandates in section 41780 and 41780.1 of the  
18 Public Resources Code; and

19  
20 (4) an explanation of how priorities between components  
21 were determined.

22  
23 (5) indication of whether the jurisdiction has been  
24 designated as, or plans to apply for designation as, a  
25 California Integrated Waste Management Board Recycling  
26 Market Development Zone.

27  
28 (b) An integrated schedule shall be submitted in the  
29 Integration Component which shall include the following:

30  
31 (1) a calendar scheduling all implementation tasks for new  
32 and expanded programs, commencing after the effective date  
33 of the Integrated Waste Management Act of 1989 through the  
34 short-term planning period, as identified in the components  
35 specified in sections 18733(a) and 18740 of this Article.  
36 The schedule shall include a short descriptive title for  
37 each task, the entity implementing the task, the task start  
38 date and milestone dates, and a schedule for funding source  
39 availability.

40  
41 (A) implementation tasks are those tasks in each component  
42 which satisfy the requirements of sections 18733.5(b) and  
43 18740(d) of this Article.

44  
45 (2) the schedule shall also show the anticipated date of  
46 achievement of the solid waste diversion mandates specified  
47 in section 41780, Public Resources Code.

48  
49  
50 NOTE: Authority cited: Sections 40502 and ~~41824~~, Public

1 Resources Code. Reference: Sections 40051, 40052, 41001, 41002,  
2 41301, 41302, ~~and~~ 41780, and 41780.1 Public Resources Code.  
3  
4  
5



State of California  
8800 Cal Center Drive  
Sacramento, CA 95826

Pete Wilson, Governor

## *News Release*

**For Immediate Release**  
November 22, 1993

For More Information Contact:  
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### **STATE WASTE BOARD APPROVES \$1.54 MILLION IN RECYCLING LOANS TO CALIFORNIA BUSINESSES**

Sacramento - Low interest loans totaling \$1.54 million were approved by the California Integrated Waste Management Board for three California businesses that plan to divert more than 265,000 tons of asphalt, wood, paper and oil filters from landfills. The firms are or will be located in a Recycling Market Development Zone.

"Finding markets for recycled goods is a top priority," said Ralph Chandler, Executive Director of the Waste Board. "This is the latest representation of the progress this Board and local governments are making in finding markets for materials that otherwise would go to landfills. We commend each of these businesses for their entrepreneurial spirit and commitment in helping California reach its diversion goals," Chandler said.

The loans are subject to Board approval of financial documentation to be submitted by the firms. Some 43 new jobs are anticipated as a result of the loans.

The three businesses scheduled to receive loans are:

#### **EcoPave California (Long Beach RMDZ)**

EcoPave is in line for a \$850,000 loan for machinery and equipment. The firm uses microwave energy and controlled hot air flow to recycle used asphalt pavement. The Long Beach plant of EcoPave will produce hot mix asphalt (HMA) from reclaimed asphalt pavement. The HMA will then be marketed in the Southern California area to paving contractors and agencies who build and repair roads. EcoPave expects to collect and reuse approximately 200,000 tons of asphalt a year and create 15 new jobs.

-More-

**Commercial Filter Recycling, Inc. (CFR) (Southern Alameda County RMDZ)**

CFR is in line for a \$250,000 loan for working capital, machinery and equipment. Located in Union City within the Southern Alameda County Recycling Market Development Zone, the firm collects used oil filters and currently ships them to Los Angeles for recycling and resale. The Waste Board loan will enable CFR to expand operations by establishing a used oil filter recycling facility at their Union City site in addition to the Los Angeles facility to sell the recycled materials to the Bay Area Markets. At full operation CFR plans to recycle 3,600 tons of used oil filters annually and create 10 new jobs.

**TRI City Economic Development Corporation (TRI-CED)**

**(Southern Alameda County RMDZ)**

TRI-CED of Union City is in line to receive a \$440,000 loan from the Waste Board to purchase real property with a warehouse and office building to expand their operations. Tri-Ced operates a curbside collection program for the city of Hayward. Beginning April 1994, TRI-CED will begin a collection program for Union City. TRI-CED plans to process 12,000 tons of waste per year and create 18 new jobs when the expansion is completed.

Recycling Market Development Zones (RMDZ) are a designated geographical area where CIWMB provides incentives for businesses to locate or expand there and utilize recyclable materials. The CIWMB loan program offers up to \$1 million or one-half the project cost of a project, whichever is less, in low interest loans. The Board incentives are in addition to ones offered by the local jurisdictions. Since the start of the loan program to encourage and assist recycling businesses in the state, the Waste Board has established 17 Recycling Market Development Zones. Low interest loans to 22 businesses have been approved that will result in markets for more than 1.6 billion pounds of waste and create hundreds of jobs.

Attachment 2  
November 22, 1993

TITLE 14	CALIFORNIA INTEGRATED WASTE MANAGEMENT BOARD
Chapter 9	PLANNING GUIDELINES AND PROCEDURES FOR PREPARING AND REVISING COUNTYWIDE INTEGRATED WASTE MANAGEMENT PLANS
Article 6.4	Nondisposal Facility Element

DETAILED ANALYSIS

Section

18752	Scope
18753	Description of Nondisposal Facilities within a City or County
18753.5	Description of Nondisposal Facilities outside a City or County
18754	Description of Transfer Stations within a City or County
18754.5	Description of Transfer Stations outside a City or County

1     **Section 18752. Scope**

2  
3     a) The Nondisposal Facility Element (NDFE) shall identify the  
4     nondisposal facilities to be used by a city or county to assist  
5     in reaching the diversion mandates of Public Resources Code  
6     Section 41780.

7  
8     b) The NDFE shall include the items identified in Sections 18752  
9     through 18754.5 of this chapter.

10  
11    c) For the purpose of this Article, a Nondisposal Facility is any  
12    solid waste facility required to obtain a permit pursuant to  
13    Article 1 (commencing with Section 44001) of Chapter 3 Part 4,  
14    except a disposal facility or a transformation facility.

15  
16    d) The NDFE should reflect information available to a city or  
17    county at the time of the development of the Element. The NDFE  
18    may also contain additional information as determined by a city  
19    or county.

20  
21    e) A city or county may include other facilities not defined as  
22    Nondisposal facilities (i.e. recycling centers, drop-off centers,  
23    HHW facilities, etc.).

24  
25    NOTE: Authority cited: Section 40502, Public Resources Code.  
26    Reference: Sections 41732 and 41733, Public Resources Code.

27  
28     **Section 18753. Description of Nondisposal Facilities within a**  
29     **City or County**

30  
31    The NDFE shall identify all existing, expansion of existing, and  
32    proposed nondisposal facilities located within a city or county  
33    which recover for reuse or recycling at least five percent of the  
34    total volume of material received by the facility.

35  
36    a) Each facility description shall include, but is not limited  
37    to:

- 38  
39        1) type of facility;  
40        2) facility capacity;  
41        3) anticipated diversion rate or expected diversion rate;  
42        and,  
43        4) participating city or counties.

44  
45    b) Each facility location description may include, but is not  
46    limited to:

- 47  
48        1) address of the facility; or,  
49        2) description of the general area, (include a land use  
50    map, zoning map, or other type of planning map).

51  
52    NOTE: Authority cited: Section 40502, Public Resources Code.  
53    Reference: Sections 41732 and 41733, Public Resources Code.

1 **Section 18753.5. Description of Nondisposal Facilities outside a**  
2 **City or County**

3  
4 The NDFE shall identify all existing, expansion of existing, and  
5 proposed nondisposal facilities which a city or county, plans to  
6 utilize, but which are not located within the city or county, and  
7 which recover for reuse or recycling at least five percent of the  
8 total volume of material received by the facility.  
9

10 a) Each facility description shall include, but is not limited  
11 to:

- 12  
13 1) type of facility;  
14 2) estimated amount of the waste sent to the facility;  
15 3) anticipated diversion rate or expected diversion rate;  
16 and,  
17 4) location of facility.  
18

19 NOTE: Authority cited: Section 40502, Public Resources Code.  
20 Reference: Sections 41732 and 41733, Public Resources Code.  
21

22 **Section 18754. Description of Transfer Stations within a City or**  
23 **county**

24  
25 The NDFE shall identify existing, expansion of existing, and  
26 proposed transfer stations located within a city or county, which  
27 recover less than five percent of the volume of materials  
28 received for reuse or recycling.  
29

30 For the purposes of this section, the Enforcement Agency shall  
31 determine, at the time of the preparation of the solid waste  
32 facilities permit, which transfer stations recover for reuse or  
33 recycling less than five percent of the total volume of material  
34 received. The EA shall provide these findings to the city or  
35 county for appropriate inclusion within their NDFE.  
36

37 a) Each facility description shall include, but is not limited  
38 to:

- 39  
40 1) name of facility; and,  
41 2) participating city or counties.  
42 3) facility capacity  
43

44 b) Each facility location description may include, but is not  
45 limited to:

- 46  
47 1) address of the facility; or,  
48 2) description of the general area, (include a land use  
49 map, zoning map, or other type of planning map).  
50

51 NOTE: Authority cited: Section 40502, Public Resources Code.  
52 Reference: Sections 41732 and 41733, Public Resources Code.  
53

1  
2 **Section 18754.5. Description of Transfer Stations outside a City**  
3 **or County**

4  
5 The NDFE shall identify existing, expansion of existing, and  
6 proposed transfer stations to be used by a city or county but not  
7 located within the city or county, which recover less than five  
8 percent of the volume of materials received for reuse or  
9 recycling.

10  
11 For the purposes of this section, the Enforcement Agency shall  
12 determine which transfer stations recover for reuse or recycling  
13 less than five percent of the total volume of material received,  
14 based on the solid waste facilities permit. The EA shall provide  
15 these findings to the city or county for appropriate inclusion  
16 within their NDFE.

17  
18  
19 a) Each facility description shall include, but is not limited  
20 to:

- 21  
22 1) name of facility; and,  
23 2) location of facility.

24  
25 NOTE: Authority cited: Section 40502, Public Resources Code.  
26 Reference: Section 41733, Public Resources Code.

November 22, 1993

## TITLE 14 CALIFORNIA INTEGRATED WASTE MANAGEMENT BOARD

Chapter 9 PLANNING GUIDELINES AND PROCEDURES FOR PREPARING,  
AND REVISING COUNTYWIDE INTEGRATED WASTE  
MANAGEMENT PLANSArticle 7.0 Procedures for Preparing and Revising City,  
Regional Agency and County Source Reduction and  
Recycling Elements, and Household Hazardous Waste  
Elements and City and County Nondisposal Facility  
Elements

## DETAILED ANALYSIS

## Section

- 18760 Applicability
- 18761 Local Task Force (LTF)
- 18762 ~~SRR and HHW Elements~~ SRRE, HHWE and NDFE
- Preparation
- 18763 Circulation of the Preliminary Draft ~~SRR and HHW~~  
Elements SRRE and HHWE for Review
- 18764 Review of Preliminary Draft ~~SRR and HHW Elements~~  
SRRE and HHWE
- 18765 Review of the Final Draft ~~SRR and HHW Elements~~  
SRRE, HHWE and NDFE
- 18766 Public Participation; Notice; Local Adoption of  
the ~~SRR and HHW Elements~~ SRRE, HHWE and NDFE
- 18767 Submittal of City and Regional Agency ~~SRR and HHW~~  
SRREs and HHWEs and City NDFEs Elements to County  
and County NDFEs to the Cities
- 18768 Submittal of ~~City SRR and HHW Elements~~ SRRE, HHWE  
and NDFEs and Amendments to NDFEs to the Board
- 18769 Board Approval of ~~City SRR and HHW SRREs, HHWEs~~  
and NDFEs Elements and Amendments to NDFEs
- 18770 Resubmittal of ~~City or County SRR and HHW SRRE,~~  
HHWE and NDFEs Elements or Amendments to NDFEs
- 18771 Annual Report: Review and Revision of City,  
Regional Agency or County SRR Elements
- 18772 Board's Biennial Review of City, Regional Agency  
or County ~~SRR Elements, and HHW Element~~ SRREs and  
HHWEs
- 18773 Board Approval of Revised ~~SRR and HHW Elements~~  
SRREs and HHWEs
- 18774 One-Year Time Extension for Meeting Diversion  
Requirements
- 18775 Reduction in Diversion and Planning Requirements.
- 18775.2 Sludge Diversion
- 18775.4 Excluded Waste Type Diversion

1     **Section 18760. Applicability.**

2  
3     (a) The procedures for preparing ~~SRR and HHW Elements~~ Source  
4     Reduction and Recycling Elements (SRREs), Household Hazardous  
5     Waste Elements (HHWEs) and Nondisposal Facility Elements (NDFEs)  
6     apply to the counties, cities, joint power authorities, regional  
7     agencies, special districts, or other agencies which are  
8     designated by the cities or counties, and are responsible for  
9     preparing ~~the SRR these~~ Elements.

10  
11         (1) ~~Local jurisdictions~~ Cities, counties and cities and  
12         counties may enter into agreements to prepare and implement  
13         ~~the SRR and HHW Elements~~ SRREs, HHWEs and NDFEs which are  
14         specific to each jurisdiction.

15  
16         (2) A city, county or a city and county jurisdiction shall  
17         be held accountable for implementation of the specified  
18         goals and programs of its ~~SRR and HHW Elements~~ SRRE and  
19         HHWE.

20  
21     (b) For the purposes of this article, a jurisdiction is a city,  
22     county, city and county or regional agency.

23  
24         NOTE: Authority cited: Sections 40502 and ~~41824~~, Public  
25         Resources Code. Reference: Sections 40002, 40950, 41000, 41300,  
26         41500, 41510, 41730, 41731, 41813, 41850, and 41823 and 40971  
27         through 40975, Public Resources Code.

28  
29  
30     **Section 18761. Local Task Force (LTF).**

31  
32     (a) Establishment. Each county board of supervisors and a  
33     majority of the cities within the county which contain a majority  
34     of the population in the county, shall submit written  
35     documentation to the Board approving the membership of their LTF,  
36     within 30 days after establishment of the LTF.

37  
38         (1) The documentation submitted to the Board shall denote  
39         the identity of the members in the LTF, and whether the  
40         members represent the governmental or the private sectors,  
41         or other entities or groups. The documentation shall define  
42         the terms of membership for each member.

43  
44         (2) The terms of membership shall be determined by the  
45         county board of supervisors and a majority of the cities  
46         within the county which contain a majority of the population  
47         in the county.

48  
49         (3) After its establishment, each LTF shall inform the Board  
50         of how frequently it intends to meet.

51  
52     (b) **Role of the LTF.** The LTF shall advise jurisdictions  
53     responsible for ~~SRR and HHW Elements~~ the SRRE, HHWE and NDFE  
54     preparation, and review goals, policies and procedures for  
55     jurisdictions ~~within the region~~, which, upon implementation, will

1 aid in meeting the solid waste management needs of the county, as  
2 well as the mandated source reduction and recycling requirements  
3 of Public Resources Code section 41780.

4  
5 (1) The LTF shall assist and advise in the review of ~~SRR and~~  
6 ~~HHW Elements~~ the SRRE, HHWE and NDFE, and shall assist  
7 jurisdictions in the implementation of the ~~SRR and HHW~~  
8 ~~Elements~~ SRRE, HHWE and NDFE.

9  
10 (2) The LTF shall provide technical guidance and information  
11 regarding source reduction, waste diversion and recycling to  
12 local jurisdictions during preparation of ~~SRR and HHW~~  
13 ~~Elements~~ the SRRE, HHWE and NDFE. Such information may be  
14 presented to the general public at public hearings and upon  
15 request by members of local government and community  
16 organizations.

17  
18 NOTE: Authority cited: Sections 40502 and ~~41824~~, Public  
19 Resources Code. Reference: Sections 40001, 40950, 41000, 41300,  
20 41500 and 41510, 41730 and 41731, Public Resources Code.

21  
22 **Section 18762. Element Preparation.**

23  
24 (a) A jurisdiction shall prepare the initial ~~SRR and HHW~~  
25 ~~Elements~~ SRRE, HHWE and NDFE pursuant to Articles 6.1, 6.2, and  
26 6.3 and 6.4 of this Chapter, as applicable.

27  
28 (1) Except as provided by Public Resources Code section  
29 41735 (a), A a jurisdiction shall comply with the California  
30 Environmental Quality Act (CEQA) pursuant to Public  
31 Resources Code section 21000 et seq.

32  
33 (b) A jurisdiction shall submit written documentation to the  
34 Board of its designation of an agency responsible for preparation  
35 of the ~~SRR and HHW Elements~~ SRRE, HHWE and NDFE within 30 days of  
36 said designation.

37  
38 (c) A jurisdiction, in coordination with the LTF, shall prepare  
39 and adopt the ~~SRR and HHW Elements~~ SRRE, HHWE and NDFE, by the  
40 dates specified in Public Resources Code sections 41000, and  
41 41300 and 41791, as applicable.

42  
43 (d) For the purposes of this article, after a jurisdiction  
44 prepares its NDFE it shall be appended to the SRRE by the  
45 jurisdiction at the time the SRRE is submitted to the Board. At  
46 the time of the five year revision of the SRRE, the NDF Element  
47 shall be incorporated into the SRRE.

48  
49 NOTE: Authority cited: Sections 40502 and ~~41824~~, Public  
50 Resources Code. Reference: Sections 21083, 40900, 40950, 41000,  
51 41003, 41300, 41303, 41500, 41510, 41730, 41731, 41732, 41733,  
52 41734, 41735, 41736, 41750 and 41780 and 41791, Public Resources  
53 Code.

1 Section 18763. Circulation of Preliminary Draft SRR and HHW  
2 Elements for Review.  
3

4 (a) A jurisdiction shall prepare a preliminary draft of its SRR  
5 and HHW Elements SRRE and HHWE. , which shall be sent to  
6 adjoining cities, the county agency responsible for the  
7 Integrated Waste Management Plan preparation, and the LTF.  
8

9 (b) If the jurisdiction is a city, the preliminary draft SRRE and  
10 HHWE shall be sent to adjoining cities, the county or regional  
11 agency responsible for the Countywide or Regional Agency  
12 Integrated Waste Management Plan preparation and the LTF.  
13

14 (c) If the jurisdiction is a county, the preliminary draft SRRE  
15 and HHWE shall be sent to adjoining cities and the LTF.  
16

17 (d) If the jurisdiction is a regional agency then the following  
18 applies:  
19

20 (1) If the regional agency is composed of a single county  
21 but does not include all of the cities within the county the  
22 preliminary draft SRRE and HHWE shall be sent to adjoining  
23 cities, the agency in the county responsible for the  
24 Countywide Integrated Waste Management Plan preparation and  
25 to the LTF.  
26

27 (2) If the regional agency is composed of a single county  
28 and all of the cities within that county the preliminary  
29 draft SRR and HHW Element shall be sent to adjoining cities  
30 and the LTF.  
31

32 (3) If the regional agency is composed of two or more  
33 counties and all of the cities within the counties, the  
34 preliminary draft SRRE and HHWE shall be sent to adjoining  
35 cities, adjoining counties and the LTF of each affected  
36 county.  
37

38 (4) If the regional agency is composed of two or more  
39 counties but does not include all of the cities within those  
40 counties, the preliminary draft SRRE and HHWE shall be sent  
41 to adjoining cities, each of the county agencies responsible  
42 for the Countywide Integrated Waste Management Plans and the  
43 LTF of each affected county.  
44

45 Each jurisdiction shall also submit ~~ten~~ three copies of the draft  
46 ~~SRR and HHW Elements SRRE and HHWE~~ to the Board.  
47

48  
49 NOTE: Authority cited: Sections 40502 and ~~41824~~, Public  
50 Resources Code. Reference: Sections 40900, 41000, 41300, 41500,  
51 41510, 41750.1 and 41790, Public Resources Code.  
52  
53  
54

1 Section 18764. Review of the Preliminary Draft SRR and HHW  
2 Elements.

3  
4 (a) Review Period. In accordance with Government Code section  
5 15376, the review period shall be a minimum of 30 days,  
6 commencing upon the date of receipt of the Preliminary Draft SRR  
7 and ~~HHW Elements~~ SRRE and HHWE by a reviewing agency. The median  
8 time for review shall be 38 days. The maximum time for review  
9 shall be 45 days.

10  
11 (1) Review by LTF. In reviewing the preliminary draft SRR  
12 and ~~HHW Elements~~ SRRE and HHWE, the LTF shall consider the  
13 issues of regional concern pursuant to Public Resources Code  
14 section 40950(c) to aid in ensuring that they are addressed.  
15 Copies of written comments made by the LTF on the  
16 preliminary draft ~~SRR and HHW Elements~~ SRRE and HHWE shall  
17 be sent simultaneously to the Board and to the jurisdiction  
18 that prepared the preliminary draft ~~SRR and HHW Elements~~  
19 SRRE and HHWE.

20  
21 (2) Review by Other Reviewing Agencies. The county, adjacent  
22 cities, any association of regional governments and the  
23 Board shall review the preliminary draft ~~SRR and HHW~~  
24 ~~Elements~~ SRRE and HHWE and send written comments to the  
25 jurisdiction that prepared the preliminary draft ~~SRR and HHW~~  
26 ~~Elements~~ SRRE and HHWE. A copy of the Board's written  
27 comments shall be sent simultaneously to the LTF.

28  
29 NOTE: Authority cited: Sections 40502 and ~~41824~~, Public  
30 Resources Code; Section 15376, Government Code. Reference:  
31 Sections 40950, 41000, 41300, 41500, 41510 and 41790, Public  
32 Resources Code.  
33  
34

35 Section 18765. Review of the Final Draft ~~SRR and HHW Elements~~  
36 SRRE, HHWE and NDFE.  
37

38 (a) Thirty (30) days prior to the public hearing for the adoption  
39 of the ~~SRR and HHW Elements~~ SRRE and HHWE, the jurisdiction shall  
40 send a copy of the final draft of its ~~SRR and HHW Elements~~ SRRE  
41 and HHWE to the LTF(s) of the affected counties for review.  
42 Within 15 days of receipt of the final draft of the ~~SRR and HHW~~  
43 ~~Elements~~ SRRE and HHWE, the LTF shall provide written comments to  
44 the jurisdiction and the Board regarding the final draft.  
45

46 (b) Prior to the public hearing for the adoption of the NDFE, the  
47 city or county shall send a copy of the final draft of the NDFE  
48 to the LTF for review. Within 90 days of receipt of the final  
49 draft of the NDFE, the LTF shall provide written comments to the  
50 city or county and the Board regarding the final draft.  
51

52 (c) ~~(1)~~ If deficiencies are indicated in the LTF's comments, the  
53 LTF shall meet with the jurisdiction to resolve them. If no  
54 resolution between the jurisdiction and the LTF can be achieved,  
55 the LTF shall send a letter to the jurisdiction and the Board

1 indicating the remaining deficiencies of the ~~SRR and HHW Elements~~  
2 SRRE, HHWE and NDFE.

3  
4 NOTE: Authority cited: Sections 40502 and ~~41824~~, Public  
5 Resources Code. Reference: Sections 40950, 40971, 41000, 41300,  
6 41500 and 41510, 41730, 41731 and 41734, Public Resources Code.

7  
8 **Section 18766. Public Participation; Notice; Local Adoption of**  
9 **~~SRR and HHW Elements~~ SRRE, HHWE and NDFE.**

10  
11 (a) The general public, affected governmental entities, and  
12 private industries shall be given an opportunity to participate  
13 in the planning process and implementation of the ~~SRR and HHW~~  
14 ~~Elements~~ SRRE, HHWE and NDFE through attendance at informative  
15 meetings and public hearings.

16  
17 (1) Pursuant to Public Resources Code section 41793, at  
18 least one public hearing shall be held to receive testimony  
19 regarding the Preliminary Draft of the ~~SRR and HHW Elements~~  
20 SRRE and HHWE before a jurisdiction adopts its ~~SRR and HHW~~  
21 ~~Elements~~ SRRE and HHWE.

22  
23 (A) To inform the public of the hearing, the  
24 jurisdiction shall publish a notice in a local  
25 newspaper of general circulation at least 30 days in  
26 advance of the scheduled public hearing on the ~~SRR and~~  
27 ~~HHW Elements~~ SRRE and HHWE.

28  
29 (2) Jurisdictions may form advisory committees which may  
30 review and comment on draft elements, and provide technical  
31 guidance and support during the development of the ~~SRR and~~  
32 ~~HHW Elements~~ SRRE, HHWE and NDFE.

33  
34 (b) In addition to the hearing or hearings held pursuant to (a)  
35 (1) of this section, the governing body of the jurisdiction ~~that~~  
36 ~~has developed the SRR and HHW Elements~~, shall conduct a public  
37 hearing for the purpose of adopting the ~~SRR and HHW Elements~~  
38 SRRE, HHWE and NDFE. After considering all comments of the  
39 members of the governing body and the public, the jurisdiction  
40 shall, by resolution, adopt the ~~SRR and HHW Elements~~ SRRE, HHWE  
41 and NDFE.

42  
43 (1) To inform the public of the hearing, the jurisdiction  
44 shall publish a notice in a newspaper of general circulation  
45 at least ten (10) days in advance of the scheduled public  
46 hearing on the final draft SRRE, HHWE and NDFE.

47  
48 NOTE: Authority cited: Sections 40502 and ~~41824~~, Public  
49 Resources Code. Reference: Sections 40900, 40971, 41000, 41300,  
50 41500, 41510, 41730, 41731 and 41793, Public Resources Code.

1 Section 18766.5 Revision of the SRRE prior to Board Approval

2  
3 (a) Nothing in this chapter shall require the jurisdiction to  
4 revise the SRRE prior to submittal to the Board for review.

5  
6 (b) If a jurisdiction revises its SRRE prior to its submittal to  
7 the Board, or a jurisdiction revises its SRRE in response to a  
8 Notice of Deficiency from the Board, then the following applies:

9  
10 (1) The revised or corrected SRRE shall be adopted, by  
11 resolution, at a public hearing.

12  
13 (2) To inform the public of the hearing, the jurisdiction  
14 shall publish a notice in a newspaper of general circulation  
15 at least ten (10) days in advance of the scheduled public  
16 hearing on the revised or corrected SRRE.

17  
18 (3) Thirty (30) days prior to the public hearing for the  
19 adoption of the revised SRRE, the jurisdiction shall send a  
20 copy of the final draft of its revised SRRE to the LTF(s) of  
21 the affected counties for review. Within 15 days of receipt  
22 of the revised SRRE, the LTF shall provide written comments  
23 to the jurisdiction and the Board regarding the revised  
24 SRRE.

25  
26 NOTE: Authority cited: Section 40502, Public Resources Code;  
27 Section 15376, Government Code. Reference: Sections 40950, 41000,  
28 41300, 41781.2, 41790, 41793

29  
30 Section 18767. Submittal of City or Regional Agency SRR and HHW  
31 SRREs and HHWEs and City NDFEs Elements to County and County  
32 NDFEs to the Cities.

33  
34 (a) A city or regional agency which is composed of some cities  
35 within a single county shall transmit a one (1) copy of its SRR  
36 SRRE and three (3) copies of its HHWE HHW Elements to the county  
37 in which it is located for incorporation into the Countywide  
38 Integrated Waste Management Plan (Plan), within 30 days of its  
39 adoption by the city or regional agency. This submittal shall  
40 occur no later than July 1, 1991, unless the jurisdiction  
41 complies with the requirements of PRC 41000 (b), as amended  
42 state. of 1990 1992, chap. 145 105.

43  
44 (1) A signed resolution and documentation that the  
45 jurisdiction has complied with CEQA (Public Resources Code  
46 sections 21000 et seq.) shall accompany the SRR and HHW  
47 Elements SRRE and HHWE that are submitted to the county.

48  
49 (b) A city, unless it is a city and county, shall transmit a copy  
50 of its NDFE to the County or Regional Agency in which it is  
51 located for incorporation into the Countywide or Regional Agency  
52 Integrated Waste Management Plan, within 30 days of its adoption  
53 by the city. This submittal shall occur no later than the  
54 applicable submittal dates in PRC section 41791.5.  
55

1 (c) A county, unless it is a city and county, shall transmit a  
2 copy of its NDFE to the cities which are located within the  
3 county within 30 days of its adoption by the county. This  
4 submittal shall occur no later than the applicable submittal  
5 dates specified in PRC 41791.5.

6  
7 NOTE: Authority cited: Sections 40502 and ~~41824~~, Public  
8 Resources Code. Reference: Sections 21083, ~~40971~~, 41000, 41300,  
9 41500, 41510, 41791, 41730, 41731, 41750.1 and 41793, Public  
10 Resources Code.

11  
12  
13 Section 18768. Submittal of City SRR and HHW Elements SRREs,  
14 HHWEs and NDFEs and Amendments to NDFEs to the Board.

15  
16 (a) A jurisdiction shall, according to the schedule set forth in  
17 PRC section 41791.5, submit to the Board three (3) copies of its  
18 SRRE.

19 (1) When submitting the SRRE to the Board, the jurisdiction  
20 shall include a copy of the public notice(s) for the public  
21 hearings on the SRRE, a copy of the resolution(s) adopting  
22 the SRRE, comments on the final draft from the LTF, and a  
23 copy of the Notice of Determination which has been filed  
24 with the State Clearinghouse in the Office of Planning and  
25 Research as verification of compliance with the CEQA (Public  
26 Resources Code sections 21000 et seq.).

27  
28 (b) A city or county, or city and county, shall, according to the  
29 schedule set forth in PRC section 41791.5, submit to the Board  
30 three copies of its NDFE.

31 (1) When submitting the NDFE or amendment to the NDFE to the  
32 Board, the city or county shall include a copy of the public  
33 notice(s) for the public hearing(s) on the NDFE, a copy of  
34 the resolution(s) adopting the NDFE or amendment and  
35 comments on the final draft from the LTF.

36  
37 (a) (c) The HHWE shall be submitted with the Countywide  
38 Integrated Waste Management Plan or the Regional Agency  
39 Integrated Waste Management Plan according to the schedule set  
40 forth in PRC section 41791. If a county fails to submit its Plan  
41 to the Board by the dates specified in Public Resources Code  
42 section 41791, any Any city or regional agency which is composed  
43 of some cities within a single county may separately submit its  
44 SRR and HHW Elements HHWE to the Board for approval.

45  
46 (1) When submitting the SRR and HHW Elements HHWE to the  
47 Board, the city or regional agency shall include a copy of  
48 the public notice(s) for the public hearings on the HHWE, a  
49 copy of the resolution(s) adopting its SRR and HHW Elements  
50 HHWE, comments on the final draft from the LTF, and a copy  
51 of the Notice of Determination which has been filed with the  
52 State's Clearinghouse in the Office of Planning and Research  
53 as verification of compliance with the CEQA (Public  
54 Resources Code sections 21000 et seq.).  
55

1 ~~(2) The Board's 120 day review period for consideration of~~  
2 ~~approval of the SRR and HHW Elements will commence upon~~  
3 ~~receipt by the Board of 20 copies of the SRR and HHW~~  
4 ~~Elements and the required accompanying documents, pursuant~~  
5 ~~to (1) of this section.~~

6  
7 ~~(3) Within 30 days of receipt of the SRR and HHW Elements~~  
8 ~~for approval, the Board shall indicate to the city whether~~  
9 ~~all requirements included in (1) and (2) of this section~~  
10 ~~have been fulfilled.~~

11  
12 (d) The Board's 120 day review period for consideration of  
13 approval of the SRRE, HHWE and NDFE will commence upon  
14 determination by the Board that three (3) copies of the SRRE,  
15 HHWE and NDFE and the accompanying documents required by (a), (b)  
16 and (c) of this section have been submitted by the jurisdiction.

17  
18 (1) Within 30 days of receipt of the SRRE, HHWE and NDFE for  
19 approval, the Board shall indicate to the jurisdiction  
20 whether all requirements included in (a), (b) and (c) have  
21 been fulfilled. If the jurisdiction is notified that the  
22 required documents have not been submitted the jurisdiction  
23 shall submit the remaining required document(s) within 30  
24 days of notification.

25  
26 (e) The Board's 60 day review period for consideration of  
27 approval of amendments to the NDFE prior to the five year  
28 revision of the SRRE will commence upon determination by the  
29 Board that three (3) copies of the amendments to the NDFE and the  
30 accompanying documents required by (b) of this section have been  
31 submitted by the jurisdiction.

32  
33 (1) Within 30 days of receipt of the amendments to the NDFE  
34 for approval, the Board shall indicate to the jurisdiction  
35 whether all requirements included in (b) have been  
36 fulfilled. If the jurisdiction is notified that the  
37 required documents have not been submitted, the jurisdiction  
38 shall submit the remaining required document(s) within 30  
39 days.

40  
41 NOTE: Authority cited: Sections 40502 and 41824, Public  
42 Resources Code and Section 15376, Government Code. Reference:  
43 Sections 21083, 40971, 41750, 41791, 41791.5, 41794, 41800 and  
44 41802, Public Resources Code.

45  
46 Section 18769. Board Approval of City SRR and HHW Elements SRRE,  
47 HHWE and NDFE and Amendments to NDF Elements.

48  
49 (a) The Board shall approve or disapprove city SRR and HHW  
50 Elements SRRE, HHWE and NDFE or amendments to NDFEs at a public  
51 hearing. After receiving testimony from the jurisdiction, the  
52 public and the LTF, the Board shall either adopt and prepare  
53 written findings approving the SRR and HHW Elements SRRE, HHWE  
54 and NDFE or amendments to the NDFE, or issue a Notice of

1 Deficiency partially or fully disapproving the ~~SRR and HHW~~  
2 Elements SRRE, HHWE and NDFE or amendments to the NDFE.

3  
4 (b) If implementation of the ~~SRR and HHW Elements SRRE, HHWE and~~  
5 NDFE will achieve the mandated requirements for the jurisdiction,  
6 the Board shall adopt a resolution approving the ~~SRR and HHW~~  
7 Elements SRRE, HHWE and NDFE. If the ~~SRR and HHW Elements SRRE,~~  
8 HHWE and NDFE are approved, or partially or fully disapproved,  
9 the Board shall send a copy of the resolution or the Notice of  
10 Deficiency, respectively, to the ~~city or county jurisdiction~~  
11 within 30 days of its action. In the Notice, the Board shall  
12 identify the deficient areas of the ~~SRR and HHW Elements SRRE,~~  
13 HHWE and NDFE.

14  
15 NOTE: Authority cited: Sections 40502 and ~~41824~~, Public  
16 Resources Code. Reference: Section 41800 and 41801, 41802 and  
17 41810 through 41813, Public Resources Code.

18  
19  
20 **Section 18770. Resubmittal of City or County SRR and HHW Elements**  
21 **the SRRE, HHWE and NDFE or Amendments to the NDFE.**  
22

23 (a) A ~~city or county jurisdiction~~ shall resubmit a corrected  
24 version of its ~~SRR and HHW Elements and a city or county, or city~~  
25 and county, shall resubmit a corrected version of its NDFE or  
26 amendment to its NDFE to the Board, pursuant to Sections 18762  
27 through 18768 of this Article, within 120 days of receipt of a  
28 Notice of Deficiency.

29  
30 (b) Within 120 days of receipt of the resubmitted element or  
31 within 60 days of the receipt of NDFE amendments, the Board shall  
32 approve or disapprove the element or amendment pursuant to Public  
33 Resources Code sections 41812 and 41813.

34  
35 NOTE: Authority cited: Sections 40502 and ~~41824~~, Public  
36 Resources Code. Reference: Sections 21083, 40950, 41000, 41300,  
37 41780, 41790, 41800, 41801, 41802 and 41810 through 41813, Public  
38 Resources Code.

39  
40  
41 **Section 18771. Annual Report: Review and Revision of City,**  
42 **Regional Agency or County SRR Elements SRREs.**  
43

44 (a) After Board approval of a ~~SRR Element SRRE~~ or a Plan, or most  
45 recent revision, the jurisdiction shall monitor the reductions in  
46 solid waste, and submit an annual report, which summarizes the  
47 jurisdiction's progress toward achieving the mandated waste  
48 reduction goals identified in Public Resources Code section  
49 41780. The report shall address the requirements as described in  
50 Section 18733.6 of this Chapter, and serve as a basis for  
51 determining whether a revision of a ~~SRR Element SRRE~~ is needed.

52  
53 (1) The Board shall review a ~~SRR Element SRRE~~ for  
54 consistency with the hierarchy requirements for waste  
55 management practices as defined in the California Integrated

1 Waste Management Act of 1989 (Public Resources Code section  
2 40000 et seq.), and assure that goals and programs of a  
3 jurisdiction, and their implementation, are adequate to meet  
4 the mandated requirements.  
5

6 (b) The jurisdiction shall submit the annual report on or before  
7 the anniversary date of Board approval of the element ~~or Plan~~ or  
8 its most recent revision.  
9

10 (c) The annual report shall address at least the following:  
11

12 (1) changes in demographics in the jurisdiction;  
13

14 (2) adequacy of the implementation schedule in the SRR  
15 Element SRRE;  
16

17 (3) changes in funding sources for implementing the SRR  
18 Element SRRE;  
19

20 (4) changes in administrative responsibilities;  
21

22 (5) future programs and facilities in the jurisdiction;  
23

24 (6) adequacy of the data base;  
25

26 (7) programs in the ~~SRR-Element~~ SRRE which were not  
27 implemented, or were not successfully accomplished, and  
28 why;  
29

30 (8) quantities and types of waste diverted through recycling  
31 and composting programs directly funded or operated by  
32 the jurisdiction;  
33

34 ~~(8)~~ (9) changes in types and quantities of waste generated  
35 disposed in by the jurisdiction;  
36

37 (10) adjustments to waste disposal quantities to account for  
38 changes in population, economics and other factors, if  
39 appropriate;  
40

41 ~~(9)~~ (11) changes in markets for recyclables in the SRR  
42 Element SRRE;  
43

44 (12) changes in regional agency agreements;  
45

46 (d) If a jurisdiction determines that a revision of the SRR  
47 Element SRRE is necessary, the jurisdiction shall prepare the  
48 revision pursuant to sections 18762 through 18768 of this  
49 Article.  
50

51 (e) The annual report shall contain a timetable for making the  
52 necessary revisions in the ~~SRR-Element~~ SRRE.  
53

1 (f) The Board may, upon review of the annual report find that a  
2 revision of the ~~SRR-Element~~ SRRE is necessary. The Board shall  
3 present its findings at a public hearing.

4  
5 (1) The jurisdiction shall be directed, by resolution from  
6 the Board, to revise its ~~SRR-Element~~ SRRE pursuant to  
7 sections 18762 through 18769 of this Article.

8  
9 NOTE: Authority cited: Sections 40502 and ~~41824~~, Public  
10 Resources Code. Reference: Sections 40050, 40051, 40052, 40950,  
11 41000, 41300, 41780, 41790, and 41821, Public Resources Code.

12  
13  
14 **Section 18772. Board's Biennial Review of City, Regional Agency**  
15 **or County SRR and HHW Elements.**

16  
17 (a) In addition to local jurisdiction review of city, regional  
18 agency and county ~~SRR and HHW Elements~~ SRREs and HHWEs, at least  
19 once every two years, the Board shall conduct an independent  
20 review of ~~SRR and HHW Elements~~ SRREs and HHWEs. This biennial  
21 review will enable the Board to assess each jurisdiction's  
22 progress towards meeting the mandated diversion and disposal  
23 requirements. The Board shall determine if the ~~SRR and HHW~~  
24 ~~Elements~~ SRRE and HHWE programs are being implemented, and if  
25 jurisdictions are meeting the goals of their ~~SRR and HHW Elements~~  
26 SRRE and HHWE.

27  
28 (b) If the Board finds that a jurisdiction is failing to  
29 implement its ~~SRR and HHW Elements~~ SRRE and HHWE, and is not  
30 making progress towards meeting the requirements of Public  
31 Resources Code sections 41000, or 41300, 41500, 41510 or 41780,  
32 as applicable, after a public hearing on the matter, the Board  
33 shall issue a compliance order for achieving those requirements.

34  
35 (1) The compliance order shall identify the programs and goals of  
36 the ~~SRR and HHW Elements~~ SRRE and HHWE which are not being  
37 implemented or attained by the jurisdiction, or identify areas of  
38 the ~~SRR and HHW Elements~~ SRRE and HHWE which require revision.  
39 The Board shall also set a date by which the jurisdiction shall  
40 meet the mandated requirements.

41  
42 (2) The Board shall issue the compliance order within 30 days of  
43 making its finding of noncompliance.

44  
45 (c) If a jurisdiction fails to bring its ~~SRR and HHW Elements~~  
46 SRRE and HHWE into compliance by the date specified by the Board,  
47 the Board shall enforce the compliance order pursuant to Public  
48 Resources Code section 41850.

49  
50 NOTE: Authority: Sections 40502 and ~~41824~~, Public Resources  
51 Code. Reference: Sections 41000, 41300, 41500, 41510, 41780,  
52 41825, and 41850.

1 **Section 18773. Board Approval of Revised ~~SRR and HHW Elements~~**  
2 **SRRE and HHWE.**

3  
4 (a) The Board shall consider approval of revised ~~SRR and HHW~~  
5 ~~Elements~~ SRREs and HHWEs at a public hearing. After considering  
6 public testimony and input from the LTF, the Board shall either  
7 adopt a resolution approving revised ~~SRR and HHW Elements~~ SRREs  
8 and HHWEs, or issue a Notice of Deficiency disapproving the ~~SRR~~  
9 ~~and HHW Elements~~ SRREs and HHWEs. Board approval shall be based  
10 on an evaluation of the jurisdiction's implementation of the  
11 hierarchy for waste management practices as described in the  
12 California Integrated Waste Management Act of 1989.

13  
14 (1) If revised ~~SRR and HHW Elements~~ SRREs and HHWEs are  
15 partially or fully disapproved, the Board shall send the  
16 Notice of Deficiency within 30 days of making its findings.

17  
18 (2) Partial or full disapproval shall require the  
19 jurisdiction to reinstitute the process for preparation and  
20 approval of the ~~SRR and HHW Elements~~ SRREs and HHWEs,  
21 beginning in Sections 18762 through 18768.

22  
23 (b) If revised ~~SRR and HHW Elements~~ SRREs and HHWEs are approved,  
24 the Board shall send a copy of the resolution of approval to the  
25 jurisdiction within thirty (30) days of making its finding.

26  
27 NOTE: Authority cited: Sections 40502 and ~~41824~~, Public  
28 Resources Code. Reference: Sections 40050, 40051, 40052, 41780,  
29 41800, 41802, 41810 through 41813 and 41822, Public Resources  
30 Code.

31  
32  
33 **Section 18774. One Year Time Extension for Meeting Diversion**  
34 **Requirements.**

35  
36 (a) Commencing in 1995, the Board may grant a one year time  
37 extension for meeting the state mandated diversion requirements  
38 identified in Public Resources Code section 41780.

39  
40 (1) A jurisdiction requesting an extension, shall  
41 demonstrate, in writing, that it meets the requirements for  
42 an extension pursuant to Public Resources Code section  
43 41820.

44  
45 (2) Within 45 days of receipt of this request, the Board  
46 shall review the adequacy of the application, and determine  
47 if the requirements of Public Resources Code section 41820  
48 are met. Based upon this determination, the Board shall  
49 adopt written findings approving or disapproving the  
50 jurisdiction's request. The one-year time extension shall  
51 begin on the date of Board approval.

52  
53 NOTE: Authority cited: Sections 40502 and ~~41824~~, Public  
54 Resources Code. Reference: Sections 41780 and 41820, Public  
55 Resources Code.

1  
2 **Section 18775. Reduction in Diversion and Planning Requirements.**  
3

4 (a) A jurisdiction city or county may petition the Board, at a  
5 public hearing, to reduce the diversion requirements specified in  
6 Public Resources Code section 41780, and planning requirements.  
7 To petition for a reduction, the jurisdiction city or county  
8 shall present verification to the Board which indicates that  
9 achievement of the requirements is not feasible due to small  
10 geographic size or low population density of the jurisdiction  
11 city or county and the small quantity of waste it generates. To  
12 qualify to petition for a reduction in the diversion and planning  
13 requirements, a city or county must meet the following :  
14

15 (1) For an incorporated city, a geographic area of less  
16 than 3 square miles or a population density of less than  
17 1500 people per square mile and a waste generation rate of  
18 less than 100 cubic yards per day or 60 tons per day .  
19

20 (2) For the unincorporated area of a county, a geographic  
21 area of less than 1500 square miles or a population density  
22 of less than 10 people per square mile and a waste  
23 generation rate of less than 100 cubic yards per day or 60  
24 tons per day.  
25

26 b) Based on information presented at the hearing, the Board may  
27 establish reduced diversion requirements, and alternative, but  
28 less comprehensive, planning requirements. A petitioner may  
29 identify those specific planning requirements from which it  
30 wants to be relieved and provide justification for the  
31 reduction. Examples of reduced planning requirements could  
32 include, but would not be limited to, reduced requirements for  
33 solid waste generation studies, and reduced requirements and  
34 consolidation of specific component requirements. These reduced  
35 planning requirements, if granted, must ensure compliance with  
36 Public Resources Code section 41782.  
37

38 (c) Cities and counties requesting a reduction in the diversion  
39 and planning requirements must include the following information  
40 in the reduction petition:  
41

42 (1) A general description of the existing disposal and  
43 diversion systems, including documentation of the types and  
44 quantities of waste disposed and diverted. Documentation  
45 sources may include, but are not limited to, the following:  
46

47 (A) Solid Waste Generation or Characterization Studies;  
48

49 (B) Diversion data from public and private recycling  
50 operations;  
51

52 (C) Current year waste loading information from  
53 permitted solid waste facilities used by the  
54 jurisdiction;  
55

1 (2) Identification of the specific reductions being  
2 requested (i.e. diversion or planning requirements or both);  
3

4 (3) Documentation of why attainment of mandated diversion  
5 and planning requirements is not feasible. Examples of  
6 documentation could include, but are not limited to:  
7

8 (A) Evidence from the documentation sources specified  
9 in paragraph (c) (1) of this section;  
10

11 (B) Verification of existing solid waste budget  
12 revenues and expenses from the duly authorized  
13 designated representative of the jurisdiction city or  
14 county;  
15

16 (4) The planning or diversion requirements that the  
17 jurisdiction city or county feels are achievable, and why.  
18

19 (d) Cities and counties which petition the Board and receive a  
20 reduction in the diversion and planning requirements pursuant to  
21 this section, shall fully address the following issues in an  
22 annual report submitted to the Board within 90 days of the  
23 anniversary date the reduction was originally granted, and each  
24 year thereafter until the Board-mandated diversion levels are  
25 met:  
26

27 (1) the jurisdiction's city or county's current activities  
28 to establish and maintain source reduction and recycling  
29 programs;  
30

31 (2) changes in demographics in the jurisdiction city or  
32 county;  
33

34 (3) changes in types and amounts of waste generated in the  
35 jurisdiction city or county;  
36

37 (4) changes in funding sources for implementing the Elements  
38 or Plan;  
39

40 (5) changes in markets for the jurisdiction's city or  
41 county's recyclables.  
42

43 (e) The Board may, upon review of the annual report, find that a  
44 revision or revocation of the reduction is necessary. The Board  
45 shall present any such findings at a public hearing.  
46

47 (f) If a regional agency is named in a regional agreement as the  
48 responsible entity for the achievement of the diversion  
49 requirements specified in PRC section 41780, neither the regional  
50 agency nor any member of the regional agency will be eligible for  
51 a reduction in the diversion requirements of PRC section 41780.  
52

53 NOTE: Authority cited: Sections 40502 and ~~41824~~, Public  
54 Resources Code. Reference: Section 41782, 41783 through 41786 and  
55 41802, 40973 Public Resources Code.

1  
2 Section 18775.2. Sludge Diversion.  
3

4 (a) Jurisdictions which have selected alternatives which involve  
5 the diversion of waste type "sludge" shall submit a written  
6 request to the Board pursuant to PRC 41781.1. Within 45 days of  
7 receipt of a jurisdiction's request, the Board shall notify the  
8 jurisdiction in writing whether sufficient information has been  
9 included in the request to enable the Board to make findings  
10 pursuant to PRC Section 41781.1. Requests that are found by the  
11 Board to be incomplete, pursuant to the criterion set forth in  
12 this section, shall be returned to the jurisdiction for revision  
13 to correct any inadequacy. The Board shall make the findings  
14 required by PRC Section 41781.1 at a public hearing no later than  
15 180 days after receipt of a complete and correct request for  
16 sludge diversion credit.

17 (1) A request for allowing sludge diversion shall include  
18 the following information:

19 (A) Description of the selected diversion  
20 alternative(s);

21 (B) Projected annual quantity of sludge waste to be  
22 diverted through the year 2000;

23 (C) Documentation that waste type "sludge" has been  
24 categorized, quantified and documented in the applicable  
25 "solid waste generation study" as defined in 14 CCR  
26 Section 18722;

27 (D) Written certification from the agent(s) responsible  
28 for implementing the sludge diversion alternative that  
29 the reuse which is proposed meets all applicable  
30 requirements of state and federal law. Information upon  
31 which the above certification is based shall be made  
32 available to the Board upon request.

33 (E) Description of monitoring program(s) that are in  
34 place or which will be established to insure that the  
35 proposed sludge diversion alternative will continue to  
36 not pose a threat to public health or the environment.  
37

38 NOTE: Authority cited: Section 40502, Public Resources  
39 Code. References: Section 41780 and 41781.1, Public Resources  
40 Code.  
41  
42

43 Section 18775.4. Use of Excluded Waste Types for Baseline  
44 Diversion Credit  
45

46 (a) To establish baseline diversion, jurisdictions which have  
47 included alternatives for the diversion of agricultural wastes,  
48 inert solids, or scrap metals as defined in PRC section  
49 41781.2 (b), or white goods as defined in Article 3 of this  
50 Chapter, shall follow the requirements specified in PRC section  
51 41781.2. Within 60 days of receipt of a jurisdiction's SRRE for  
52 final review, the Board shall notify the jurisdiction in writing  
53 if there is insufficient information to determine that the  
54 criteria specified in PRC section 41781.2 have been met. This

1 notification shall be based on the criteria specified in PRC  
2 section 41801.5 (b).

3  
4 (b) If a jurisdiction has been notified as per subsection (a),  
5 the jurisdiction may, concurrent with the procedures specified in  
6 section 18770 of this article, submit additional information to  
7 the Board which substantiates that the criteria specified in PRC  
8 section 41781.2 have been met. Within 60 days of receipt of the  
9 additional information, the Board shall determine whether  
10 diversion of all or a portion of the excluded waste will be  
11 allowed for the purposes of compliance with the diversion  
12 requirements of PRC section 41780.

13  
14 (c) Based on the Board's determination in subsection (b), the  
15 jurisdiction shall revise its SRRE to correct any inadequacy and  
16 shall resubmit it to the Board within 120 days of the Board's  
17 determination. If a jurisdiction is unable to resubmit its  
18 revised SRRE within 120 days, the Board may, on a case by case  
19 basis, extend the deadline for resubmittal. Upon receipt of a  
20 resubmitted element, the Board shall follow the procedures  
21 specified in section 18770 of this article.

22  
23 NOTE: Authority cited: Section 40502, Public Resources  
24 Code. References: Section 41780, 41781.2, 41801.5 and 41811.5,  
25 Public Resources Code.

INITIAL STUDY

Title of Proposal: Initial Study and Checklist

Date Checklist Submitted: \_\_\_\_\_

Agency Requiring Checklist: California Integrated Waste Management Board

Agency Address: 8800 Cal Center Drive

City/State/Zip: Sacramento, CA 95826

Agency Contact: Catherine L. Cardozo

Phone: (916) 255-2656

DETERMINATION

On the basis of this initial evaluation:

a) I find that the proposal project could not have a significant effect on the environment, and  
A NEGATIVE DECLARATION will be prepared ..... X

b) I find that although the proposed project could have a significant effect on the environment,  
there will not be a significant effect in this case because the mitigation measures described on  
an attached sheet have been added to the project.

A NEGATIVE DECLARATION will be prepared .....

c) I find the proposed project may have a significant effect on the environment, and

An ENVIRONMENTAL IMPACT REPORT is required .....

LK Van Kekerix  
Signature

Lorraine Van Kekerix  
Print Name

California Integrated Waste Management Board

10/28/93  
Date

## INITIAL STUDY ENVIRONMENTAL CHECKLIST

PROJECT LOCATION: Statewide

**DESCRIPTION OF PROJECT:** The California Integrated Waste Management Board (Board) staff has prepared the enclosed initial study and negative declaration for proposed regulations regarding the preparation, adoption and approval of the Source Reduction and Recycling Element (SRRE) and the Nondisposal Facility Element (NDFE). The proposed regulations would amend Title 14, California Code of Regulations, Division 7, Chapter 9, by revising Article 6.1, Solid Waste Generation Studies, Sections 18722-18724; Article 6.2, Source Reduction and Recycling Elements, Sections 18730-18748, 18760-18777 and adding Sections 18752-18754.5; Article 6.4, Nondisposal Facility Elements (NDFE); Article 7.0, Procedures for Preparing and Revising City and County Source Reduction and Recycling Elements, Sections 18770-18775; and Article 8.0, Procedures for Preparing and Revising Countywide Siting elements and Countywide Integrated Waste Management Plans, Sections 18776-187790. Public Resources Code section 40502, as revised by [Chapter 1169, statutes of 1993, AB 440 (Sher)] directs the Board to adopt emergency regulations regarding the preparation, adoption and approval of the SRRE and NDFE by December 31, 1993.

These amendments are proposed in response to statutory changes relating to the preparation, adoption and approval of the Source Reduction and Recycling Element (SRRE) and the Nondisposal Facility Element (NDFE).

Changes in Article 6.1 relates to change from generation-base to disposal-base accounting system and regional agencies. Article 6.2 added provisions for regional agencies' SRREs, and provisions for initial and subsequent SRREs. Articles 6.4 is a new set of regulations. Article 7.0 changed the reporting system that cities would be able to report their SRREs directly to the Board. Article 8.0 relates to changes in time reduction requirements for preparation, adoption and submittal of documents.

### ENVIRONMENTAL IMPACTS:

	Yes	Maybe	No
<b>I. EARTH.</b> Will the proposal result in:			
a) Unstable earth conditions or in changes in geologic substructures?	—	—	<u>X</u>
b) Disruptions, displacements, compaction or overcovering of the soil?	—	—	<u>X</u>
c) Change in topography or ground surface relief features?	—	—	<u>X</u>
d) The destruction, covering or modification of any unique geologic or physical features?	—	—	<u>X</u>
e) Any increase in wind or water erosion of soils, either on or off site?	—	—	<u>X</u>
f) Changes in deposition or erosion of beachsands, or changes in siltation, deposition or erosion which may modify the channel of a river or stream or the bed of the ocean or any bay, inlet or lake?	—	—	<u>X</u>

- g) Exposure of people or property to geologic hazards, such as earthquakes, landslides, mudslides, ground failure, or similar hazards?

— — X

### DISCUSSION

This project is a set of revisions of regulations which governs the preparation of Integrated Waste Management plan. The regulations do not specify particular development projects. Therefore, no environment impacts are expected.

### II. AIR. Will the proposal result in:

- a) Substantial air emissions or deterioration of ambient air quality?

— — X

- b) The creation of objectionable odors?

— — X

- c) Alteration of air movement, moisture, or temperature, or any change in climate, either locally or regionally?

— — X

### DISCUSSION

This project is a set of revisions of regulations which governs the preparation of Integrated Waste Management plan. The regulations do not specify particular development projects. Therefore, no environment impacts are expected.

### III. WATER. Will the proposal result in:

Yes Maybe No

- a) Changes in currents, or the course or direction of water movements, in either marine or freshwaters?

— — X

- b) Changes in absorption rates, drainage patterns, or the rate and amount of surface runoff?

— — X

- c) Alterations to the course or flow of flood waters?

— — X

- d) Changes in the amount of surface water in any water body?

— — X

- e) Discharge into surface waters, or in any alteration of surface water quality, including but not limited to, temperature, dissolved oxygen or turbidity?

— — X

- f) Alteration of the direction or rate of flow of ground waters?

— — X

- g) Change in the quantity of ground waters, either through direct additions or withdrawals, or through interception of an aquifer by cuts or excavations?

— — X

- h) Substantial reduction in the amount of water otherwise available for public water supplies?

— — X

- i) Exposure of people or property to water related hazards such as flooding or tidal waves?

— — X

### DISCUSSION

This project is a set of revisions of regulations which governs the preparation of Integrated Waste Management plan. The regulations do not specify particular development projects. Therefore, no environment impacts are expected.

### IV. PLANT LIFE. Will the proposal result in:

- a) Change in the diversity of species, or number or any species of plants

(including trees, shrubs, grass, crops, and aquatic plants)?

— — X

b) Reduction of the numbers of any unique, rare, or endangered species of plants?

— — X

c) Introduction of new species of plants into an area, or in a barrier to the normal replenishment of existing species?

— — X

d) Reduction in acreage of any agricultural crop?

— — X

### DISCUSSION

This project is a set of revisions of regulations which governs the preparation of Integrated Waste Management plan. The regulations do not specifies particular development projects. Therefore, no environment impacts are expected.

### **V. ANIMAL LIFE.** Will the proposal result in:

a) Change in the diversity of species, or numbers of any species of animals (birds; land animals, including reptiles; fish and shellfish, benthic organisms or insects)?

— — X

b) Reduction of the numbers of any unique, rare, or endangered species or animals?

— — X

c) Introduction of new species of animals into an area, or result in a barrier to the migration or movement of animals?

— — X

d) Deterioration to existing fish or wildlife habitat?

— — X

### DISCUSSION

This project is a set of revisions of regulations which governs the preparation of Integrated Waste Management plan. The regulations do not specifies particular development projects. Therefore, no environment impacts are expected.

### **VI. NOISE.** Will the proposal result in:

a) Increases in existing noise levels?

— — X

b) Exposure of people to severe noise levels?

— — X

### DISCUSSION

This project is a set of revisions of regulations which governs the preparation of Integrated Waste Management plan. The regulations do not specifies particular development projects. Therefore, no environment impacts are expected.

### **VII. LIGHT and GLARE.** Will the proposal:

Yes      Maybe      No

a) Produce new light or glare?

— — X

### DISCUSSION

This project is a set of revisions of regulations which governs the preparation of Integrated Waste Management plan. The regulations do not specifies particular development projects. Therefore, no environment impacts are expected.

### **VIII. LAND USE.** Will the proposal result in:

a) Substantial alteration of the present or planned land use of an area?

— — X

## DISCUSSION

Regulations revisions do not propose specific developments. Therefore, no environment impacts are expected.

IX. NATURAL RESOURCES. Will the proposal result in:

- a) Increase in the rate of use of any natural resources?

\_\_\_ \_\_\_ X

## DISCUSSION

This project is a set of revisions of regulations which governs the preparation of Integrated Waste Management plan. The regulations do not specifies particular development projects. Therefore, no environment impacts are expected.

X. RISK OF UPSET. Will the proposal involve:

- a) A risk of an explosion or the release of hazardous substances (including, but not limited to: oil, pesticides, chemicals or radiation) in the event of an accident or upset condition?

\_\_\_ X \_\_\_

- b) Possible interference with an emergency response plan or an emergency evacuation plan?

\_\_\_ \_\_\_ X

## DISCUSSION

Article 6.1 deals with Solid Waste Generation Studies which requires sorting of solid waste. there may be a potential health hazards from landfill gases and hazardous wastes. Potential impacts would be site-specific and dependent on the type of material found. Mitigation Measures to reduce any potential impacts must comply with applicable local, state or federal regulations.

### Mitigation Measures

The mitigation measures necessary to reduce any impacts to less than significant levels are to be in conformance of "Injury Illness Prevention Program" Plan described in Title 8.

XI. POPULATION. Will the proposal:

- a) Alter the location, distribution, density or growth rate of the human population of an area?

\_\_\_ \_\_\_ X

## DISCUSSION

This project is a set of revisions of regulations which governs the preparation of Integrated Waste Management plan. The regulations do not specifies particular development projects. Therefore, no environment impacts are expected.

XII. HOUSING. Will the proposal:

- a) Affect existing housing, or create a demand for additional housing?

\_\_\_ \_\_\_ X

## DISCUSSION

This project is a set of revisions of regulations which governs the preparation of Integrated Waste Management plan. The regulations do not specifies particular development projects. Therefore, no environment impacts are expected.

XIII. TRANSPORTATION/CIRCULATION. Will the proposal result in:

- |   |   |   |          |
|---|---|---|----------|
| a) Generation of substantial additional vehicular movement?                           | — | — | <u>X</u> |
| b) Effects on existing parking facilities, or demand for new parking?                 | — | — | <u>X</u> |
| c) Substantial impact upon existing transportation systems?                           | — | — | <u>X</u> |
| d) Alterations to present patterns of circulation or movement of people and/or goods? | — | — | <u>X</u> |
| e) Alterations to waterborne, rail or air traffic?                                    | — | — | <u>X</u> |
| f) Increase in traffic hazards to motor vehicles, bicyclists, or pedestrians?         | — | — | <u>X</u> |

#### DISCUSSION

This project is a set of revisions of regulations which governs the preparation of Integrated Waste Management plan. The regulations do not specifies particular development projects. Therefore, no environment impacts are expected.

#### **XIV. PUBLIC SERVICES.** Will the proposal have an effect upon, or result in a need for a new or altered governmental services in any of the following areas:

- |   |   |   |          |
|---|---|---|----------|
| a) Fire protection?                                   | — | — | <u>X</u> |
| b) Police protection?                                 | — | — | <u>X</u> |
| c) Schools?   | — | — | <u>X</u> |
| d) Parks or other recreational facilities?            | — | — | <u>X</u> |
| e) Maintenance of public facilities, including roads? | — | — | <u>X</u> |
| f) Other governments services?                        | — | — | <u>X</u> |

#### DISCUSSION

This project is a set of revisions of regulations which governs the preparation of Integrated Waste Management plan. The regulations do not specifies particular development projects. Therefore, no environment impacts are expected.

#### **XV. ENERGY.** Will the proposal result in:

Yes      Maybe      No

- |   |   |   |          |
|---|---|---|----------|
| a) Use of substantial amounts of fuel or energy?  | — | — | <u>X</u> |
| b) Substantial increase in demand upon existing sources of energy, or require the development of new sources of energy? | — | — | <u>X</u> |

#### DISCUSSION

This project is a set of revisions of regulations which governs the preparation of Integrated Waste Management plan. The regulations do not specifies particular development projects. Therefore, no environment impacts are expected.

#### **XVI. UTILITIES and SERVICE SYSTEMS.** Will the proposal result in a need for new systems, or substantial alterations to the following utilities:

- |                            |   |   |          |
|----------------------------|---|---|----------|
| a) Power or natural gas?   | — | — | <u>X</u> |
| b) Communications systems? | — | — | <u>X</u> |
| c) Water?                  | — | — | <u>X</u> |

- |                              |   |   |          |
|------------------------------|---|---|----------|
| d) Sewer or septic tanks?    | — | — | <u>X</u> |
| e) Storm water drainage?     | — | — | <u>X</u> |
| d) Solid waste and disposal? | — | — | <u>X</u> |

#### DISCUSSION

This project is a set of revisions of regulations which governs the preparation of Integrated Waste Management plan. The regulations do not specifies particular development projects. Therefore, no environment impacts are expected.

#### XVII. HUMAN HEALTH. Will the proposal result in:

- |  |   |          |   |
|--|---|----------|---|
| a) Creation of any health hazard or potential health hazard (excluding mental health)? | — | <u>X</u> | — |
| b) Exposure of people to potential health hazards?                                     | — | <u>X</u> | — |

#### DISCUSSION

Article 6.1 deals with Solid Waste Generations Studies which requires solid waste characterization. Characterization of solid waste may include sorting of solid waste, which may result in potential health hazards from hazardous material such as medical waste containing sharp needles, dead animals, and disease-bearing vectors.

#### Mitigation Measures

Personnel performing such waste sort should be adequately trained with emphasis on safety, health, and emergency procedures. Workers should wear protective clothing such as hard hats, face or eye shields, coveralls, safety vest, PVC boots with steel toe and full midsole. In cases where hazardous substances are found, the worker should warn others and notify their supervisors. Mitigation measures for reducing health hazards from conducting waste characterization are commonly required by local jurisdictions.

#### XVIII. AESTHETICS. Will the proposal result in:

- |   |   |   |          |
|---|---|---|----------|
| a) The obstruction of any scenic vista or view open to the public?      | — | — | <u>X</u> |
| b) The creation of an aesthetically offensive site open to public view? | — | — | <u>X</u> |

#### DISCUSSION

This project is a set of revisions of regulations which governs the preparation of Integrated Waste Management plan. The regulations do not specifies particular development projects. Therefore, no environment impacts are expected.

#### XIX. RECREATION. Will the proposal result in:

- |  |   |   |          |
|--|---|---|----------|
| a) Impact upon the quality or quantity of existing recreational opportunities? | — | — | <u>X</u> |
|--|---|---|----------|

#### DISCUSSION

This project is a set of revisions of regulations which governs the preparation of Integrated Waste Management plan. The regulations do not specifies particular development projects. Therefore, no environment impacts are expected.

#### XX. CULTURAL RESOURCES. Will the proposal:

- |  |  |  |  |
|--|--|--|--|
| a) Result in the alteration of or the destruction of a prehistoric or historic |  |  |  |
|--|--|--|--|

archaeological site?	—	—	<u>X</u>
b) Result in adverse physical or aesthetic effects to a prehistoric or historic building, structure, or object?	—	—	<u>X</u>
c) Have the potential to cause a physical change which would affect unique ethnic cultural values?	—	—	<u>X</u>
d) Restrict existing religious or sacred uses within the potential impact area?	—	—	<u>X</u>

### DISCUSSION

This project is a set of revisions of regulations which governs the preparation of Integrated Waste Management plan. The regulations do not specifies particular development projects. Therefore, no environment impacts are expected.

### XXI. MANDATORY FINDINGS OF SIGNIFICANCE.

	Yes	Maybe	No
a) <b>Potential to degrade:</b> Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	—	—	<u>X</u>
b) <b>Short-term:</b> Does the project have the potential to achieve short-term, to the disadvantage of long-term, environmental goals? (A short-term impact on the environment is one which occurs in a relatively, brief, definitive period of time. Long-term impacts will endure well into the future.)	—	—	<u>X</u>
c) <b>Cumulative:</b> Does the project have impacts which are individually limited, but cumulatively considerable? (A project may impact on two or more separate resources where the impact on each resource is relatively small, but where the effect on the total of those impacts on the environment is significant.)	—	—	<u>X</u>
d) <b>Substantial adverse:</b> Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	—	—	<u>X</u>

### DISCUSSION

This project is a set of revisions of regulations which governs the preparation of Integrated Waste Management plan. The regulations do not specifies particular development projects. Therefore, no environment impacts are expected.

### XXII. DISCUSSION OF ENVIRONMENTAL EVALUATION.

Approval of the proposed project will not result in significant environmental impacts.

# PROPOSED NEGATIVE DECLARATION

PROPOSED REGULATION REVISIONS REGARDING THE PREPARATION, ADOPTION  
AND APPROVAL OF THE SOURCE REDUCTION AND RECYCLING ELEMENT (SRRE)  
AND THE NONDISPOSAL FACILITY ELEMENT (NDFE)

## PROJECT DESCRIPTION

The project consists of proposed regulations which would amend Title 14, California Code of Regulations, Division 7, Chapter 9, by revising Article 6.1, Solid Waste Generation Studies, Sections 18722-18724; Article 6.2, Source Reduction and Recycling Elements, Sections 18730-18748, 18760-18777 and adding Sections 18752-18754.5; Article 6.4, Nondisposal Facility Element (NDFE); Article 7.0, Procedures for Preparing and Revising City and County Source Reduction and Recycling Elements, Sections 18770-18775; and Article 8.0, Procedures for Preparing and Revising Countywide Siting elements and Countywide Integrated Waste Management Plans, Sections 18776-187790. Public Resources Code section 40502, as revised by [Chapter 1169, statutes of 1993] directs the Board to adopt emergency regulations regarding the preparation, adoption and approval of the SRRE and NDFE by December 31, 1993.

## PROPOSED FINDING

The regulations proposed by the California Integrated Waste Management Board will not have a significant effect on the environment. The attached initial study documents this finding.

## MITIGATION MEASURES

Several areas have been identified in the Environmental Checklist portion of the Initial Study as having potential for significant environmental impacts. These are in the areas of : risk of upset and human health. Staff believes that a combination of adherence to existing federal, state and local laws, and site-specific mitigation measures and conditions developed for each project will insure that the impacts are not significant.

Dated: 11-23-93

Dorothy Rice

Dorothy Rice, Deputy Director  
Governmental and Regulatory Affairs Division  
California Integrated Waste Management Board

**California Integrated Waste Management Board  
Resolution 93-138  
December 15, 1993**

Adoption of the Negative Declaration for Emergency Regulations for Title 14, California Code of Regulations, Division 7, Chapter 9 Article 6.4, 6.2 and 7.0

**WHEREAS**, the California Environmental Quality Act (Public Resources Code Section 1000 et. seq.), and State CEQA Guidelines, Section 15074 (b) requires that prior to approval of a proposed project, the decision-making body of the Board, as Lead Agency, shall consider the proposed Negative Declaration for the adoption of emergency regulations, together with any comments received during the public review process. The decision-making body shall approve the Negative Declaration if it finds on the basis of the Initial Study and any comments received that there is no substantial evidence that the project will have a significant effect in the environment.

**WHEREAS**, the Board has reviewed the proposed Negative Declaration together with all comments received during the state agency review period assigned by the State Clearinghouse and public review period announced in three newspapers of general circulation throughout the State of California as required by the State CEQA Guidelines, Section 15072(a).

**NOW, THEREFORE, BE IT RESOLVED**, the Board hereby deems the proposed Negative Declaration complete.

**BE IT FURTHER RESOLVED**, the Board has determined that the project as proposed will not have a significant effect on the environment.

**BE IT FURTHER RESOLVED**, the Board adopts the Negative Declaration, State Clearinghouse Number 93112080.

**BE IT FURTHER RESOLVED**, the Board directs staff to prepare and submit a Notice of Determination of the project to the State Clearinghouse for filing as required by the State CEQA Guidelines, Section 15075.

**CERTIFICATION**

The undersigned Executive Director of the California Integrated Waste Management Board does hereby certify that the foregoing is a full, true, and correct copy of a resolution duly and regularly adopted at a meeting of the California Integrated Waste Management Board held on December 15, 1993.

Dated:

Ralph E. Chandler  
Executive Director

**California Integrated Waste Management Board  
Resolution 93-137  
December 15, 1993**

Adoption of Emergency Regulations for Title 14, California Code of Regulations, Division 7, Chapter 9 Article 6.4, 6.2 and 7.0 for the New Regulations for the Preparation of City and County Nondisposal Facility Elements, Revised Regulations for the Preparation of the Content of City, County, and Regional Agency Source Reduction and Recycling Elements, and Revised Regulations for the Procedures for Preparing and Revising City, Regional Agency and County Source Reduction and Recycling Elements, Household Hazardous Waste Elements, and City and County Nondisposal Facility Elements.

**WHEREAS**, Public Resources Code (PRC) Section 40502 directs the California Integrated Waste Management Board (Board) to adopt emergency regulations regarding city, county and regional agency Source Reduction and Recycling Elements, and Nondisposal Facility Elements no later than December 31, 1993; and

**WHEREAS**, these emergency regulations are required to facilitate the implementation of AB 2494 (Sher, Stats. 1992, c. 1292), AB 3001 (Cortese, Stats. 1992, c. 1291), and AB 440 (Sher, Stats. 1993, c. 1169); and

**WHEREAS**, AB 440 requires the Board to conduct two public hearings to accept comment on the emergency regulations and notice the emergency regulations in the California Regulatory Notice Register; and

**WHEREAS**, On October 20, 1993, the Office of Administrative Law published the Notice for emergency regulations rulemaking in the California Regulatory Notice Register; and

**WHEREAS**, the Board conducted one public hearing in the City of Whittier on November 16, 1993, and one public hearing in the City of Sacramento on November 19, 1993, to accept comment on the emergency regulations; and

**WHEREAS**, the Board staff have revised the regulations as appropriate, based on public comment; and

**WHEREAS**, the Board's Local Assistance and Planning Committee considered the emergency regulation at its December 7, 1993, meeting, and found the regulations to be adequate, and directed Board staff to submit the regulations for consideration by the Board on December 15, 1993; and

**WHEREAS**, an Initial Study and Negative Declaration were prepared and pursuant to the California Environmental Quality Act (CEQA) and have been noticed for public review and comment and have fulfilled all CEQA requirements; and

**WHEREAS**, the Board has fulfilled all of the requirements of Government Code Sections 11346.1, 11346.2, paragraphs (2) to (6), inclusive, of subdivision (a) of Section 11346.5, 11349.1 and 11349.6.

**NOW, THEREFORE, BE IT RESOLVED** that the Board hereby adopts the proposed emergency regulations for Title 14, California Code of Regulations, Division 7, Chapter 9, Articles 6.4, 6.2 and 7.0.

**BE IT FURTHER RESOLVED** that the Board directs staff to submit the emergency regulations to the Office of Administrative Law for review, approval, and filing with the Secretary of State.

#### **Certification**

The undersigned Executive Director of the California Integrated Waste Management Board does hereby certify that the foregoing is a full, true and correct copy of a resolution duly and regularly adopted at a meeting of the California Integrated Waste Management Board held on December 15, 1993.

Dated:

Ralph E. Chandler  
Executive Director

**CALIFORNIA INTEGRATED WASTE MANAGEMENT BOARD**

**LOCAL ASSISTANCE AND PLANNING COMMITTEE**

December 7, 1993

**AGENDA ITEM 4**

**ITEM:** CONSIDERATION OF STAFF RECOMMENDATIONS ON THE STATUS  
REPORT DOCUMENT FORMAT

**BACKGROUND:**

The Board is required in the Public Resources Code (PRC) Section 41821(b) to develop a one-time, brief reporting form to be used by jurisdictions to summarize their progress toward meeting the diversion mandates of PRC Section 41780. The form must be adopted by December 30, 1993. Therefore, adoption of this brief reporting form by the Board prior to this date is required.

The information provided in these summary reports will be compiled by Board staff and summarized in a statewide status report that will be sent to the Legislature by January 1, 1995. The purpose of this summarized report is to provide the Legislature with information on the status of jurisdictions' progress toward achieving the diversion requirements of PRC Section 41780.

**Analysis:**

PRC Section 41821, as amended by AB 440, now requires a summary report from each jurisdiction to be submitted to the Board at the time of, or prior to, submittal of its final Source Reduction and Recycling Elements (SRRE). Status reports are due on April 30, 1994; August 31, 1994; and October 1, 1994.

This status report will only contain information necessary to determine the progress a jurisdiction is making toward meeting the diversion requirements of Section 41780. This is not a compliance tool or methodology. Board staff will distribute a brief, standardized form with instructions to all jurisdictions. Jurisdictions, in turn, will complete and return the information to the Board.

Pursuant to Section 41821(b) (1-3), the information required from each jurisdiction will include:

- a) changes in tonnage of solid waste disposed (compared to the jurisdiction's base year);
- b) changes in tonnage of solid waste diverted through programs "operated" by the jurisdiction; and,
- c) the status of programs described in the SRRE.

The only other information this status report may include will be a jurisdiction's explanations or clarifications of the information.

The Status Report packet will contain a cover letter, the instruction sheet and Status Report questionnaire. These documents are being prepared by the Office of Local Assistance (OLA) and Plan

Implementation Branch (PIB) and will be available for review closer to the date of the Planning Committee meeting. PIB, OLA and Information Management Branch (IMB) staff are preparing the status report format so the data can be easily converted to a database. The database will be used to collect and store the status report data in order for the statewide summary report(s) to be generated and dispersed to the Legislature and jurisdictions. This packet will be dispersed to jurisdictions in late December 1993 or January 1994.

Jurisdictions will review and complete the information requested and return the status report form to the Board in three phases in concert with the pre-determined schedule for each jurisdiction to submit their final SRRE. These phases are April 30, August 31, with the last wave of status reports being submitted October 1.

Status report data collected between April 30 and October 1, 1994, will need to be compiled, analyzed and in final report form for approval at the December 1994 Planning Committee and Board meetings, so it can be submitted to the Legislature prior to January 1, 1995.

**STAFF COMMENTS:**

Staff recommends the Committee approve the status report form, cover letter and instruction sheet and forward these to the full Board for their consideration.

**ATTACHMENTS:**

The Status Report packet will be available for review closer to the date of the Planning Committee meeting.

Prepared by: Becky Shumway *BS*

Phone: 255-2420

Reviewed by: Catherine Cardozo *CC*

Phone: 255-2656

Reviewed by: Judith Friedman *JF*

Phone: 255-2555

Reviewed by: Lorraine Van Kekerix *LVK*

Phone: 255-2670

Reviewed by: Dorothy Rice *D. Rice*

Phone: 255-2206

Legal Review: PIB

Date/Time: 11/12/93 9:30 a.m.

CALIFORNIA INTEGRATED WASTE MANAGEMENT BOARD

LOCAL ASSISTANCE AND PLANNING COMMITTEE

December 7, 1993

Agenda Item 5

**ITEM:** Consideration of Staff Recommendations Concerning the Development of Guidelines for Submittal of Documentation for Baseline Diversion Credit for Excluded Wastes.

**BACKGROUND:**

In 1991, based on data in several preliminary Source Reduction and Recycling Elements (SRRE's), concern developed among the environmental community, the Legislature, and the Board about the means by which some local jurisdictions were planning to meet the solid waste diversion requirements of the Integrated Waste Management Act of 1989 (Act). Many jurisdictions were claiming to have already achieved the 25% diversion mandate, and were nearing the 50% diversion mandate with existing high diversion levels of inert solids, scrap metals and agricultural wastes.

The concern was that counting diversion of these typically heavy waste materials toward weight-based reduction mandates could lead to the mandates being met primarily with existing diversion of these waste types. A jurisdiction would not need to develop new diversion programs to reduce disposal amounts between the baseline (base-year) and 1995, and the year 2000. This was a concern because a main purpose of the Act was to foster the development of local diversion programs that did not exist prior to the Act.

In response to this concern, the Board passed a resolution in March of 1992 addressing the diversion of agricultural wastes, inert solids, scrap metals, and white goods (now referred to as the "excluded wastes"). Most of the language in the resolution was contained in Assembly Bill 2494 (AB 2494) which became effective January 1, 1993.

AB 2494 contained procedures and requirements for jurisdictions wanting to count diversion of these excluded waste types in their base-year diversion totals. AB 2494 was chaptered and the section of the law pertaining to base-year diversion of excluded waste types is now located in Public Resources Code (PRC) Section 41781.2.

PRC Section 41781.2 specifies three criteria that restrict a jurisdiction's base-year claims for diverting agricultural wastes, inert solids, scrap metals, and white goods. Statute requires exclusion of such diversion claims unless a jurisdiction demonstrates three criteria are met. AB 2494 does not require jurisdictions to revise their SRREs in response to the requirements of PRC Section 41781.2 prior to submittal of their final SRREs. Instead, a jurisdiction may choose to submit documentation verifying compliance with these three criteria with its final SRRE, as per the schedule outlined in PRC Section 41791.5, or following Board disapproval of the final SRRE. PRC Section 41811.5 specifies the data submittal and subsequent Board review timelines for supporting data submitted after Board disapproval of the SRRE.

The first criterion requires that a jurisdiction demonstrate through documentation that the diversion was a direct result of a specific action(s) (as defined in PRC Section 41781.2 (b)(1)) taken by the jurisdiction. The documentation must also demonstrate that the action occurred before January 1, 1990 and that the action was specifically related to (or resulted in) the claimed diversion.

The second criterion requires that a jurisdiction also demonstrate that prior to January 1, 1990, the solid waste claimed to have been diverted was disposed in a permitted disposal facility in the quantity being claimed as diversion. In the absence of historical documentation, additional information may be provided to the Board to substantiate a reasonable estimate of historical disposal quantities.

The third criterion requires that a jurisdiction demonstrate it is implementing, and will continue to implement, source reduction, recycling, and composting programs, as described in its SRRE.

Ultimate approval of any base-year diversion claim will be determined by the Board, on a case-by-case basis. Prior to Board approval or disapproval of the final SRRE, if it appears the exclusion of the amounts claimed will result in a shortfall of the diversion mandates, Board staff will recommend that the Board issue a Notice of Deficiency to the jurisdiction.

#### ANALYSIS:

Staff believes that some additional clarification is needed for PRC Section 41781.2 regarding base-year diversion credit for diversion of excluded waste types, to adequately address the proper documentation needed to meet the statutory requirements of

that section. Staff developed a guidance policy (attached) to provide the necessary guidance.

Because PRC Section 41781.2 pertains to the calculation of base-year diversion, it applies only to diversion activities occurring before January 1, 1990. Only base-year diversion of these materials is restricted; diversion of these materials after 1990 will contribute toward reducing disposal tonnage.

**PUBLIC COMMENT:**

On March 11, 1993, Board staff conducted a focused workshop regarding the base-year diversion restriction issue. Representatives from local government, industry and public interest groups attended the workshop. Different points relating to the base-year diversion issue were discussed. Staff used this forum to help guide the development of this policy.

On November 1, 1993, the proposed base-year diversion restriction guidelines were mailed to all jurisdictions and other interested parties. The public comment period ended November 21, 1993. The comments received as of November 22 can be summarized as follows:

**1) Alameda County Waste Management Authority and City of Alameda Comments:**

a) The two agencies objected to the requirement that the local agency action that resulted in the diversion must have "specifically targeted the restricted waste type". The word "targeted" was specifically removed from AB 2494's language so the public action merely had to "result" in the diversion. The proposed policy should be modified accordingly.

Response:

a) Board staff agree, and have modified the language accordingly.

**2) City of Sunnyvale Comments:**

a) May a jurisdiction describe a specific action that resulted in the diversion of one of the excluded waste types, or is it necessary to provide copies of contracts between a City and a hauler, documenting diversion-related agreements?

b) Please provide further explanation and/or examples of how the policy would be applied in specific situations.

c) The requirement that jurisdictions demonstrate implementation of diversion programs described in the SRRE is too sweeping.

d) Not all of the programs or actions taken by a jurisdiction may have been covered in its initial SRRE.

e) The criterion should be specific to diversion programs for the excluded waste type being claimed for diversion, i.e., the jurisdiction should demonstrate the diversion activity for that waste type will continue.

Response:

a) The jurisdiction must provide a copy of the city's resolution, and relevant portion of the agreement with a hauler, whenever such documentation is available.

b) The guidance policy may be modified in the future as specific examples are reviewed by the Board.

c) Comment noted. The language cited is statutory language, which the Board cannot change at its discretion.

d) Staff realize that jurisdictions may implement diversion programs or activities other than those outlined in a jurisdiction's initial SRRE. Board staff will be looking for a demonstration that a jurisdiction is not relying solely on the diversion of the excluded waste types to achieve its diversion mandates.

e) The purpose for the third criterion is to insure that a jurisdiction is implementing diversion activities other than those for an excluded waste type.

**3) Monterey Regional Waste Management District Comments:**

a) Please add "special districts" to the definition of action by a city, county, regional, or local governing body.

b) Please include in the guidance policy clarification on how disputed diversion claims will be resolved, so that local operations/jurisdictions would be fairly judged for their claims.

Response:

a) A special district, such as the Monterey Regional Waste Management District, would be regarded as a local governing body for this section. Board staff will specify this interpretation in the guidance policy.

b) Disputes will be resolved on a case-by-case basis, as a jurisdiction's final SRRE and base-year diversion claim is evaluated.

**CONCLUSION:**

The base-year diversion restriction issue has been discussed by the Board and other parties for several years. The Board's adopted resolution on this issue was incorporated into statute effective January 1, 1993 (AB 2494). These proposed policy guidelines will offer further guidance to those jurisdictions claiming base-year diversion of excluded waste types.

**RECOMMENDATION:**

Staff recommends that the Planning Committee approve the attached guidelines and forward them to the full Board for their review and adoption.

**ATTACHMENTS:**

1. November 1, 1993 letter to interested parties requesting comment on the base-year diversion restriction documentation guidelines, and the proposed guidelines
2. Public comment letters received by November 22, 1993:
  - Alameda Waste Management Authority, November 18, 1993
  - City of Alameda; November 19, 1993
  - City of Sunnyvale; November 19, 1993
  - Monterey Regional Waste Management District; November 18, 1993

**Prepared by:**

Catherine Cardozo *CC*  
Kevin Taylor *CT (for)*

Phone: 255-2656  
Phone: 255-2310

**Reviewed by:**

Judith Friedman *JF*  
Lorraine Van Kekerix *LK*  
Dorothy Rice *D. Rice*

Phone: 255-2302  
Phone: 255-2670  
Phone: 255-2208

Legal review: EB

Phone: 11/21/93 10:23 a.m.

ATTACHMENT I-

**CALIFORNIA INTEGRATED WASTE MANAGEMENT BOARD**8800 Cal Center Drive  
Sacramento, California 95826

November 1, 1993

To Interested Parties:

Public Resources Code Section 41781.2 (Chapter 1292, Statutes of 1992 AB 2494, Sher, and Chapter 1169, Statutes of 1993, AB 440, Sher) specifies three criteria that restrict a jurisdiction's base-year claims for diverting agricultural wastes, inert solids, scrap metals, and white goods. Many jurisdictions claimed base-year diversion for these restricted wastes in the solid waste generation study component of their initial Source Reduction and Recycling Elements (SRREs). The statutory changes restricted base-year diversion claims after SRREs were prepared.

Statute requires disallowance of diversion claims unless the Board receives additional documentation showing that all three criteria are met. The statute does not require additional documentation to be submitted prior to Board consideration of the final SRREs. Statute allows submission of material following Board review.

Board staff have developed the attached guidance document to assist jurisdictions claiming base-year diversion of these waste types. Types of documentation to verify local action, historical documentation, and implementation of programs are described. Submittal and review of documentation are also described. Ultimate approval of any base-year diversion claim will be determined by the Board, on a case-by-case basis.

Board staff are seeking comments solely on clarification of points and types of documentation required to demonstrate local action, historical disposal amounts and program implementation.

The Local Assistance and Planning Committee will be considering the proposed policy on base-year diversion claims for restricted waste types at its December 7, 1993 meeting in Sacramento. We anticipate the full Board will consider the policy at its December 15, 1993 meeting. The public comment period on the proposed policy ends on November 21, 1993. Please submit comments to:

Catherine Cardozo  
California Integrated Waste  
Management Board  
8800 Cal Center Drive  
Sacramento, CA 95826  
Fax (916) 255-2221

Proposed Base-Year Diversion Policy  
November 1, 1993  
Page 2

If you have any questions regarding this guidance document, please contact Kevin Taylor, Office of Local Assistant Branch, at (916) 255-2310 or Claire Miller, Plan Implementation Branch (916) 255-2419 of my staff.

Sincerely,

A handwritten signature in cursive script that reads "Dorothy Rice".

Dorothy Rice, Deputy Director  
Governmental & Regulatory Affairs Division

**PROPOSED POLICY ON BASE-YEAR DIVERSION CLAIMS FOR RESTRICTED WASTE TYPES**

Statutory changes effective on January 1, 1993 and October 11, 1993, specify three criteria that may restrict a jurisdiction's base-year claims for diverting agricultural wastes, inert solids, scrap metals, and white goods [Public Resources Code (PRC) Section 41781.2)]. The proposed policy was developed to clarify the requirements of PRC Section 41781.2 for obtaining base-year diversion credit for restricted waste types. To receive base-year diversion credit, a city, county or regional agency must satisfy all three criteria in this section, and submit additional information as required by law.

Because PRC Section 41781.2 pertains to the calculation of base-year diversion, it applies only to diversion activities occurring before January 1, 1990. Only base-year diversion of these materials is restricted; diversion of these materials after 1990 will contribute towards reducing disposal tonnage.

**STATUTE**

The following statutory section applies to base-year diversion claims:

41781.2. (a) (1) It is the intent of the legislature in enacting this section not to require cities, counties, and regional agencies to revise source reduction and recycling elements prior to their submittal to the board for review and approval, except as the elements would otherwise be required to be revised by the board pursuant to this part. Pursuant to Sections 41801.5 and 41811.5, compliance with this section shall be determined by the board when source reduction and recycling elements are submitted to the board pursuant to Section 41791.5. However, any city or county may choose to revise its source reduction and recycling element or any of its components prior to Board review of the source reduction and recycling element for the purpose of complying with this section.

(2) It is further the intent of the Legislature in enacting this section to ensure that compliance with the diversion requirements of Section 41780 shall be accurately determined based upon a correlation between solid waste which was disposed of at permitted disposal facilities and diversion claims which are subsequently made for that solid waste.

(b) For the purposes of this section, the following terms have the following meaning:

(1) "Action by a city, county, regional agency, or local governing body" means franchise or contract conditions, rate or fee schedules, zoning or land use decisions, disposal facility permit conditions, or activities by a waste hauler, recycler, or disposal facility operator acting on behalf of a city, county, regional agency, or local governing body, or other action by the local governing body, if the local government action is specifically related to the claimed diversion.

(2) "Scrap metal" includes ferrous metals, nonferrous metals, aluminum scrap, other metals, and auto bodies, but does not include aluminum cans, steel cans, or bimetal cans.

(3) "Inert solids" includes rock, concrete, brick, sand, soil, fines, asphalt, and unsorted construction and demolition waste.

(4) "Agricultural wastes" includes solid wastes of plant and animal origin, which result from the production and processing of farm or agricultural products, including manures, orchard and vineyard prunings, and crop residues, which are removed from the site of generation for solid waste management. Agriculture refers to SIC Codes 011 to 0291, inclusive.

(c) For purposes of determining the base amount of solid waste from which the diversion requirements of this article shall be calculated, "solid waste" does not include the diversion of agricultural wastes; inert solids, including inert solids use for structural fill; discarded, white-coated, major appliances; and scrap metals; unless all of the following criteria are met:

(1) The city, county, or regional agency demonstrates that the material was diverted from a permitted disposal facility through an action by the city, county, or regional agency which specifically resulted in the diversion.

(2) The city, county or regional agency demonstrates that, prior to January 1, 1990, the solid waste which is claimed to have been diverted was disposed of at a permitted disposal facility in the quantity being claimed as diversion. If historical disposal data is not available, that demonstration may be based upon information available to the city, county or regional agency which substantiates a reasonable estimate of disposal quantities which is as accurate as is feasible in the absence of the historical disposal data.

(3) The city, county or regional agency is implementing and will continue to implement, source reduction, recycling, and composting programs, as described in its source reduction and recycling element.

(d) If a city, county, or regional agency source reduction and recycling element submitted pursuant to this chapter includes the diversion of any of the waste specified in subdivision (c) for years preceding the year commencing January 1, 1990, that diversion shall not apply to the diversion requirements of Section 41780, unless the criteria in subdivision (c) are met.

(e) If a city, county or regional agency source reduction and recycling element submitted pursuant to this chapter does not contain information sufficient for the city, county, or regional agency to demonstrate to the board whether the criteria in subdivision (c) have been met, the city, county, or regional agency may provide additional information following board review of the source reduction and recycling element pursuant to section 41791.5. In providing the additional information, Sections 41801.5 and 41811.5 shall apply.

(f) In demonstrating whether the requirements of paragraph (1) of subdivision (c) have been met, the city, county or regional agency shall submit information to the board on local government programs which are specifically related to the claimed diversion.

#### **GUIDANCE ON MEETING CRITERIA FOR BASE-YEAR DIVERSION CREDIT**

Jurisdictions that wish to include base-year diversion of restricted waste types must submit documentation which satisfies the three criteria and demonstrates the material was both disposed and diverted prior to 1990. A summary of these criteria is: 1) the diversion was a direct result of a jurisdiction's action; 2) the diversion claimed equals the amount disposed; 3) a jurisdiction is fully implementing the diversion programs described in its Source Reduction & Recycling Element (SRRE). An expanded discussion of the three criteria follows.

##### **1. LOCAL ACTION [PRC Section 41781.2(c)(1)]**

A jurisdiction claiming base-year diversion credit for a restricted waste type must demonstrate that the diversion was a direct result of a specific action(s) (as defined in the statute noted above) taken by the jurisdiction a city, county, regional agency, or local governing body, such as a waste management authority, sanitation district, or regional waste management district. A specific action is defined in statute as:

- franchise or contract conditions;
- rate or fee schedules;
- zoning or land use decisions;
- disposal facility permit conditions; or
- activities by a waste hauler, recycler, or disposal facility operator acting on behalf of a city, county or regional agency.

Additional types of documentation may include:

- City Council or County Board of Supervisor's resolutions;
- contract agreements;
- official copies of a jurisdiction's budget sheet, showing funding for selected diversion programs;
- letters regarding diversion activities;
- memorandums of understanding;
- written contracts;
- diversion facility permits; or

- a letter describing diversion-related agreements between a jurisdiction and a hauler, identifying the parties involved, if official documentation of a jurisdiction's action is not available; or
- other types of documentation as approved by the Board on a case-by-case basis.

The documentation must also demonstrate:

- the action occurred before January 1, 1990 (PRC Section 41781.2(c)(2)); and
- the action was specifically targeted the ~~restricted waste type being related to, or resulted in the claimed toward base year diversion~~ (PRC Section 41781.2(c)(1)).

## 2. HISTORICAL DOCUMENTATION [PRC Section 41781.2(c)(2)]

A jurisdiction claiming base-year diversion credit for a restricted waste type must also demonstrate that prior to January 1, 1990, the solid waste claimed to have been diverted was disposed in a permitted disposal facility in the quantity being claimed as diversion.

Historical documentation of disposal of restricted waste may include:

- records of City, County, or State agencies; or
- records of landfill operators, private hauler records, or commercial operators.

In the absence of such historical documentation, additional information may be provided to the Board to substantiate a reasonable estimate of historical disposal quantities if it includes the following information:

- a description of activities that contributed to disposal of these waste types prior to January 1, 1990;
- a description of the methods or calculations used to estimate the quantities of restricted waste types landfilled by the jurisdiction prior to January 1, 1990; or
- other types of documentation as approved by the Board on a case-by-case basis.

### 3. PROGRAM IMPLEMENTATION [PRC Section 41781.2(c)(3)]

A jurisdiction claiming base-year diversion credit for a restricted waste type must also demonstrate that it is implementing, and will continue to implement, source reduction, recycling, and composting programs, as described in its SRRE.

Evidence of program implementation may include:

- City Council or County Board of Supervisor's resolutions;
- contract agreements identifying diversion programs;
- official copies of a jurisdiction's budget sheet, showing funding for selected diversion programs;
- diversion facility permits;
- diversion equipment purchase invoices;
- evidence of administrative policies which achieve diversion, such as procurement and waste prevention; or
- other types of documentation as approved by the Board on a case by case basis.

### SUBMITTAL AND REVIEW OF DOCUMENTATION

If a jurisdiction wishes to substantiate their base-year diversion claim for a restricted waste type, they may elect one of the following courses of action:

- submission of documentation with the final SRRE as specified in PRC Section 41791.5, or
- submission of documentation after Board review of the final SRRE, as allowed by PRC Section 41811.5.

Following the public Board hearing to approve or disapprove the final SRRE, if it appears that the exclusion of the amounts claimed results in a shortfall of the diversion mandates, Board staff will recommend that the Board issue a Notice of Deficiency to the jurisdiction.

ATTACHMENT III



Thomas M. Martinsen  
Executive Director

November 18, 1993

Catherine Cardozo  
California Integrated Waste Management Board  
8800 Cal Center Drive  
Sacramento, CA 95826

Subject: Proposed Policy on Base-Year Diversion Claims for Restricted Waste Types

Dear Ms. Cardozo:

This letter is in response to your referral of the proposed "guidance document" for local jurisdiction claims for base-year diversion of inert materials and other restricted waste types. Generally, the proposed policies appear to be workable and consistent with the statutes added in 1992 by AB 2494.

**However, the Authority strongly objects to the proposed requirement that the local agency action that resulted in the diversion must have "specifically targeted the restricted waste type".** At one time in the history of AB 2494, Section 41781.2 did require that a public agency must have "targeted" the restricted materials in order to get credit for the base year diversion. In response to comments by this Authority and others, this language was deliberately changed so that the public action merely had to "result" in the diversion. The intent was that local governments would not need to have specifically referred to the diversion of the restricted materials as part of the agency "action."

The Authority appreciates the CIWMB's consideration of our comments and looks forward to continuing to participate in the development of new regulations and policies dealing with waste management. If you have any questions or comments on this matter, please contact me or Dick Edminster, Planning Manager, at the Authority offices.

Sincerely,

A handwritten signature in dark ink, appearing to read 'Thomas M. Martinsen', written in a cursive style.

Thomas M. Martinsen  
Executive Director

cc: Hon. Byron Sher  
Yvonne Hunter, League of California Cities



# CITY OF ALAMEDA

C A L I F O R N I A

November 19, 1993

Catherine Cardozo  
California Integrated Waste Management Board  
8800 Cal Center Drive  
Sacramento, California 95826

Dear Ms. Cardozo:

Thank you for providing an opportunity for us to comment on the documentation required to support local government claims for base-year diversion of agricultural wastes, inert solids, scrap metals and white goods.

The documentation requirements proposed for Historical Documentation and Program Implementation appear to be fair and reasonable.

Under Local Action, however, there is a statement which overstates the actual requirements of Public Resources Code Section 41781.2(c)(1). I refer to page 4 of the "Proposed Policy on Base Year Diversion Claims for Restricted Waste Types", the second bullet under "The documentation must also demonstrate:". This bullet states that the action must have "specifically targeted" the restricted waste type. In fact, section 41781.2(c)(1) states that the local jurisdiction must demonstrate that the material was diverted through an action by the agency which "specifically resulted in the diversion." There is no condition that the material had to be "targeted" prior to or by that action.

I suggest that you modify the language of this sentence to read "the action specifically resulted in diversion of the restricted waste type being claimed toward base-year diversion", to eliminate any confusion.

If you have any questions or comments, please do not hesitate to call me at (510) 748-4652.

Sincerely,

Barbara B. Frierson  
Recycling Technician

cc: Yvonne Hunter  
League of California Cities

City of Alameda . Waste Management Division . 2411 Santa Clara Avenue, Room 40  
Alameda . California . 94501 . (510) 748-4650 Fax (510) 769-7051





November 19, 1993

Ms. Catherine Cardozo  
California Integrated Waste Management Board  
8800 Cal Center Drive  
Sacramento, CA 95826

Post-It™ brand fax transmittal memo 7671		# of pages » 2
To: Mrs. Catherine Cardozo	From: Mark Bowers	
Co: C.I.W.M.B.	Co: City of Sunnyvale	
Dept:	Phone: (408) 730-7421	
Fax: 916-255-2221	Fax: (408) 730-7286	

Subject: Proposed Policy on Base-Year Diversion Claims for Restricted Waste Types

Dear Ms. Cardozo:

I am writing to comment on the proposed policy for the base-year diversion claims for agricultural wastes, inert solids, scrap metals, and white goods.

As proposed, the policy is well structured and allows jurisdictions several options to substantiate their diversion claims for the specific waste. The City's comments deal with its understanding of the policy and the criteria of program implementation.

#### Understanding the Policy

Based on the document, the City of Sunnyvale understands that the City would qualify for the base year diversion credit based on the following example:

Up to 1984 asphalt and concrete were landfilled at the Sunnyvale Landfill. In 1985 the City negotiated and the Council approved a contract with a local recycler to conduct a asphalt and concrete recycling operation at the site of the landfill. Between 1985 and the present the operation recycled concrete and asphalt, including 15,000 tons of material generated in Sunnyvale in 1990. The City will qualify for the base year diversion credit for 15,000 tons of asphalt and concrete as presented in the City's SRRE.

If this is an improper understanding of this policy, I would suggest further explanation of the policy be made, followed by examples of how it would be applied in specific situations.

#### Program Implementation

The third criterion for base-year diversion credit, which requires that, "jurisdictions demonstrate implementing, and will continue to implement, source reduction, recycling and composting programs as described in their SRRE" is too sweeping a requirement for documents that were approved in 1991.

ADDRESS ALL MAIL TO: P.O. BOX 3707 SUNNYVALE, CALIFORNIA 94088-3707  
For deaf access, call TDD/TTY (408) 730-7501

Since 1991 the City has made significant strides towards its diversion goals. However, not all of the programs or actions taken may have been covered in the SRRE. The City has acted in the spirit of the document, but the programs that were suggested may not continue to relate to the present actions or policies of the City. More recent decisions, for example, the City's decision to invest \$6.3 million in materials recovery equipment have had a great positive impact on our ability to meet our diversion goal but were not emphasized in the SRRE when it was approved.

To judge our diversion credits on all programs in the SRRE is inappropriate. The criterion should be specific to the particular waste to which the diversion credit is being applied. For instance, a jurisdiction receiving credit for asphalt and concrete recycling should demonstrate that the operation will continue.

If you have any questions or would like to discuss our understanding of the policy, please call me at (408) 730-7421.

Very truly yours,

Marvin A. Rose  
Director of Public Works



Mark A. Bowers  
Solid Waste Program Manager

MAB:js

cc: Richard Gurney, Recycling Coordinator

C:\MARK\CARDOZO\LTRYjs



BOARD OF DIRECTORS  
 CHARLES BENSON  
 CHAIRMAN  
 GARY BALES  
 ELSE WICKHAM  
 DAN ALBERT  
 RONDA LEWIS  
 BARBARA LIVINGSTON  
 LINDA HORNING  
 GERT FOREMAN

# MONTEREY REGIONAL WASTE MANAGEMENT DISTRICT

*Area of Jonathan Livingston Seagull*

DAVID  
 GENERAL  
 WILLIAM  
 DISTRICT  
 RICHARD  
 SENIOR  
 RICHARD  
 ADMIN. SERV  
 ROBERT WELLS

November 18, 1993

Ms. Catherine Cardoza  
 CIWMB  
 8800 Cal Center Drive  
 Sacramento, CA 95826

RE: Proposed Policy on Baseline Diversion Claims for Restricted  
 Waste Types. (AB2494 and AB440)

Via Fax: (916) 255-2221

Dear Ms. Cardoza:

Please accept the following comments to the above referred policy documents.

1. Section 41781.2 (b) (1) refers to "regional agency, or local governing body". We request that "Special Districts", such as the MRWMD, be added to the definition.
2. Page 3. Guidance on Meeting Criteria For Base-Year. Diversion Credit, Introductory Paragraph, No. 2) states: "The diversion claimed equals the amount disposed."

It is unclear how disputed claims which are received will be resolved. We suggest clarification on this issue, such that local operations/jurisdictions would be fairly judged for their claims.

Thank you for the opportunity to comment on these issues.

Sincerely,

*William M. Merry*  
 William M. Merry P.E.  
 District Engineer

*J. David Myers*  
 J. David Myers  
 General Manager

cc: P. Milligan

**CALIFORNIA INTEGRATED WASTE MANAGEMENT BOARD**  
**INTEGRATED WASTE MANAGEMENT PLANNING COMMITTEE**

DECEMBER 7, 1993

**AGENDA ITEM # 6**

**ITEM:** Consideration of the Model for preparing a Nondisposal Facility Element

**BACKGROUND:**

Public Resources Code (PRC) Section 40912 requires that the Board develop models for the countywide or regionwide siting element and the countywide or regionwide integrated waste management plan (summary plan). The models will be available to counties and regional agencies to help guide them in meeting regulatory requirements when they prepare their documents. Assembly Bill 3001 (PRC Sections 41730-41736) separated nondisposal facilities from the siting element and created the Nondisposal Facility Element (NDFE). Board staff determined that a model for the nondisposal facilities could be developed for guidance as part of the assistance given to local governments (PRC Section 40910). Each city and county must prepare an NDFE for the Countywide or Regionwide Integrated Waste Management Plan (CIWMP or RIWMP). The NDFE will be incorporated into each jurisdiction's Source Reduction and Recycling Element at the five year revision.

Jurisdictions are required to submit their locally adopted Source Reduction and Recycling Element (SRRE) and NDFE in 1994. PRC Section 41791.5 requires submittal on the following schedule:

1. Any jurisdiction with less than eight years shall submit their SRRE and NDFE on or before April 30, 1994.
2. Any jurisdiction with eight years or more years but less than 15 years shall submit their SRRE and NDFE on or before August 31, 1994.
3. Any jurisdiction with 15 years or more years shall submit their SRRE and NDFE on or before December 31, 1994.

The Board has a contract with Environmental Science Associates (ESA) to develop the models for the nondisposal facility element, the siting element, and the summary plan. The model NDFE is being presented separately from the models for the Siting Element and Summary Plan so that the NDFE model may become available for jurisdictions to use as they prepare for the submittals next year.

**ANALYSIS:**

Article 6.4, California Code of Regulations (CCR) Sections 18752 through 18754.5 were developed to clarify PRC Sections 41730-41736. Jurisdictions must describe all nondisposal facilities that they will use to manage their waste stream. There are two

categories of facilities, those inside and those outside a jurisdiction. Within these two categories are two types of facilities; facilities that recover more than 5% of the total waste received and those that recover less than 5% of the total waste received. The four types of facility descriptions are as follows:

1. For facilities within the jurisdiction that recover more than 5%, the description includes facility name, address, type of facility, facility capacity, diversion rate expected, general description of surrounding area, and participating jurisdictions.
2. For transfers station within the jurisdiction that recover less than 5% of the total volume, the description includes facility name, address, participating jurisdictions, and general description of the surrounding area.
3. For a facility recovering more than 5% but located outside of jurisdiction, the description includes facility name, address, facility type, amount of waste sent, and expected diversion rate.
4. For a facility that is located outside of a jurisdiction but that recovers less than 5%, the description need only be the name and address of the facility.

In general, the description for each facility will be brief. The length of the NDFE would be determined by the number of facilities that a jurisdiction uses to manage its waste stream. It should be noted that those transfer facilities that recover less than 5% of the total waste stream received are not subject to Board approval. These facilities are separated from the other facilities to assist jurisdictions in identifying those facilities that do not contribute significantly to the 25% and 50% diversion goals.

### Conclusion

The NDFE model provides a clear explanation of the requirements for describing a nondisposal facility. Descriptions of several nondisposal facilities are included in the model to guide jurisdictions in meeting the requirements. The guidance provided by the model will enable cities and counties to prepare their NDFE with minimal time and effort.

The model NDFE meets the requirements in CCR Sections 18752 to 18754.5. Board staff believe that this model will provide useful guidance to jurisdictions when they prepare their NDFE.

ATTACHMENTS

1. Copy of 14 CCR Sections 18752-18754.5.
2. Copy of the Model Nondisposal Facility Element
3. Resolution 93-

Prepared by: Catherine Donahue *CD* Phone (916) 255-2315

Reviewed by: John Nuffer *JN* Phone (916) 255-2368

Reviewed by: Judith Friedman *J. Friedman* Phone (916) 255-2555

Reviewed by: Dorothy Rice *D. Rice* Phone (916) 255-2206

Legal Review: EB Date/Time 11/23/93 1:00 p.m.

November 22, 1993

TITLE 14 CALIFORNIA INTEGRATED WASTE MANAGEMENT BOARD

Chapter 9 PLANNING GUIDELINES AND PROCEDURES FOR PREPARING  
AND REVISING COUNTYWIDE INTEGRATED WASTE  
MANAGEMENT PLANS

Article 6.4 Nondisposal Facility Element

DETAILED ANALYSIS

Section

- 18752 Scope  
18753 Description of Nondisposal Facilities within a  
City or County  
18753.5 Description of Nondisposal Facilities outside a  
City or County  
18754 Description of Transfer Stations within a  
City or County  
18754.5 Description of Transfer Stations outside a  
City or County

1     **Section 18752. Scope**

2  
3     a) The Nondisposal Facility Element (NDFE) shall identify the  
4     nondisposal facilities to be used by a city or county to assist  
5     in reaching the diversion mandates of Public Resources Code  
6     Section 41780.

7  
8     b) The NDFE shall include the items identified in Sections 18752  
9     through 18754.5 of this chapter.

10  
11    c) For the purpose of this Article, a Nondisposal Facility is any  
12    solid waste facility required to obtain a permit pursuant to  
13    Article 1 (commencing with Section 44001) of Chapter 3 Part 4,  
14    except a disposal facility or a transformation facility.

15  
16    d) The NDFE should reflect information available to a city or  
17    county at the time of the development of the Element. The NDFE  
18    may also contain additional information as determined by a city  
19    or county.

20-  
21    e) A city or county may include other facilities not defined as  
22    Nondisposal facilities (i.e. recycling centers, drop-off centers,  
23    HHW facilities, etc.).

24  
25    NOTE: Authority cited: Section 40502, Public Resources Code.  
26    Reference: Sections 41732 and 41733, Public Resources Code.

27  
28     **Section 18753. Description of Nondisposal Facilities within a**  
29     **City or County**

30  
31    The NDFE shall identify all existing, expansion of existing, and  
32    proposed nondisposal facilities located within a city or county  
33    which recover for reuse or recycling at least five percent of the  
34    total volume of material received by the facility.

35  
36    a) Each facility description shall include, but is not limited  
37    to:

- 38  
39        1) type of facility;  
40        2) facility capacity;  
41        3) anticipated diversion rate or expected diversion rate;  
42        and,  
43        4) participating city or counties.

44  
45    b) Each facility location description may include, but is not  
46    limited to:

- 47  
48        1) address of the facility; or,  
49        2) description of the general area, (include a land use  
50    map, zoning map, or other type of planning map).

51  
52    NOTE: Authority cited: Section 40502, Public Resources Code.  
53    Reference: Sections 41732 and 41733, Public Resources Code.

1 **Section 18753.5. Description of Nondisposal Facilities outside a**  
2 **City or County**

3  
4 The NDFE shall identify all existing, expansion of existing, and  
5 proposed nondisposal facilities which a city or county, plans to  
6 utilize, but which are not located within the city or county, and  
7 which recover for reuse or recycling at least five percent of the  
8 total volume of material received by the facility.  
9

10 a) Each facility description shall include, but is not limited  
11 to:

- 12  
13 1) type of facility;  
14 2) estimated amount of the waste sent to the facility;  
15 3) anticipated diversion rate or expected diversion rate;  
16 and,  
17 4) location of facility.  
18

19 NOTE: Authority cited: Section 40502, Public Resources Code.  
20 Reference: Sections 41732 and 41733, Public Resources Code.  
21

22 **Section 18754. Description of Transfer Stations within a City or**  
23 **county**

24  
25 The NDFE shall identify existing, expansion of existing, and  
26 proposed transfer stations located within a city or county, which  
27 recover less than five percent of the volume of materials  
28 received for reuse or recycling.  
29

30 For the purposes of this section, the Enforcement Agency shall  
31 determine, at the time of the preparation of the solid waste  
32 facilities permit, which transfer stations recover for reuse or  
33 recycling less than five percent of the total volume of material  
34 received. The EA shall provide these findings to the city or  
35 county for appropriate inclusion within their NDFE.  
36

37 a) Each facility description shall include, but is not limited  
38 to:

- 39  
40 1) name of facility; and,  
41 2) participating city or counties.  
42 3) facility capacity  
43

44 b) Each facility location description may include, but is not  
45 limited to:

- 46  
47 1) address of the facility; or,  
48 2) description of the general area, (include a land use  
49 map, zoning map, or other type of planning map).  
50

51 NOTE: Authority cited: Section 40502, Public Resources Code.  
52 Reference: Sections 41732 and 41733, Public Resources Code.  
53

1  
2 **Section 18754.5. Description of Transfer Stations outside a City**  
3 **or County**  
4

5 The NDFE shall identify existing, expansion of existing, and  
6 proposed transfer stations to be used by a city or county but not  
7 located within the city or county, which recover less than five  
8 percent of the volume of materials received for reuse or  
9 recycling.  
10

11 For the purposes of this section, the Enforcement Agency shall  
12 determine which transfer stations recover for reuse or recycling  
13 less than five percent of the total volume of material received,  
14 based on the solid waste facilities permit. The EA shall provide  
15 these findings to the city or county for appropriate inclusion  
16 within their NDFE.  
17

18  
19 a) Each facility description shall include, but is not limited  
20 to:  
21

- 22 1) name of facility; and,  
23 2) location of facility.  
24

25 NOTE: Authority cited: Section 40502, Public Resources Code.  
26 Reference: Section 41733, Public Resources Code.  
27  
28  
29  
30  
31

# HOW TO PREPARE A NONDISPOSAL FACILITY ELEMENT

## Introduction

The California Integrated Waste Management Act (Act) requires cities and counties in California to prepare, adopt, and implement Source Reduction and Recycling Elements (SRREs) and Household Hazardous Waste Elements (HHWEs). It also requires counties or regional agencies to prepare a Countywide or Regional Siting Element. All of these Elements are to be included in a Countywide or Regionwide Integrated Waste Management Plan.

In 1992, the California legislature enacted Assembly Bill 3001 (Cortese) which amended the Act. This statute required California cities and counties to prepare another Element, the Nondisposal Facility Element (NDFE). This document provides a Model Nondisposal Facility Element. It is an example of appropriate content and format for an NDFE. However, the model provided in this document is not the only method of presenting the information required and jurisdictions may determine that other presentations are better suited to their needs.

This model consists of three sections. The first section identifies applicable statutes and regulations. It provides the definition of a Nondisposal Facility. The second section identifies the statutory and regulatory requirements for preparation and adoption of the NDFE. The third section is the model NDFE which has been prepared for a hypothetical California city.

## Section 1 Definition and Requirements

### Applicable Statutes

The basic statutory requirements for the content and format of the NDFE are found in Public Resources Code (PRC), Division 30, Part 2, Chapter 4.5, Sections 41730 et seq. These sections also include statutory requirements for adopting and amending the NDFE. These statutory requirements are further clarified in regulations proposed by the California Integrated Waste Management Board (Board) describing the contents of the NDFE (California Code of Regulations (CCR), Title 14, Division 7, Chapter 9, Article 6.4, proposed new sections 18752 through 18754.5).

A Nondisposal Facility is defined by PRC Section 40151 as any solid waste facility required to obtain a state solid waste facility permit other than solid waste disposal and transformation facilities. Thus, transfer stations, material recovery facilities, large-scale composting facilities, and other waste processing or recycling facilities which require a solid waste facility permit, and which are needed to implement local SRREs, are considered Nondisposal facilities that need to be identified and described in the NDFE. Solid waste landfills and incinerators, however, are not included within the definition of a Nondisposal facility. Likewise, small scale activities which do not need a solid waste facility permit such as backyard composting or a small scale beverage container buy-back center, are also not included within the definition of

a Nondisposal facility and need not be discussed in the NDFE.

PRC Section 41733 clarifies further the way in which transfer stations are to be dealt with in the NDFE. It notes that all new solid waste facilities and solid waste facility expansions (except for landfills and transformation facilities) which recover for reuse or recycling at least 5 percent of the total volume of material received by the facility, shall be identified and described in the NDFE. Furthermore, transfer stations which recover less than 5 percent of the volume of materials received shall also be included in the NDFE. However, the portion of the element describing these transfer stations are not subject to approval by the California Integrated Waste Management Board (Board).

#### Planning Requirements

The statutory requirements for preparation of the NDFE (PRC Section 41732) are relatively simple and straightforward. The NDFE must "include a description of new facilities and the expansion of existing facilities which will be needed to implement the jurisdiction's SRRE," and they may include either "the identification of specific locations or general areas" where new or expanded solid waste facilities will be sited.

An important point to note is that PRC Section 41732 does not limit this requirement to just those Nondisposal facilities located, or to be located, in the jurisdiction preparing the NDFE; any Nondisposal facility which is needed to implement the jurisdiction's SRRE must be described in the NDFE. Thus, for example, a city which has indicated in its SRRE that its source separated yard waste will be taken to a new composting facility that is planned to be sited and developed in the unincorporated County, would need to include the new County yard waste composting facility in its NDFE.

The regulations guiding preparation of the NDFE are also simple and straightforward. The overall scope of the NDFE is first identified in CCR Section 18752. This section states that the NDFE is required to identify the Nondisposal Facilities which will be used by a local jurisdiction to achieve the 25% and 50% waste diversion mandates. It further indicates that the NDFE must reflect only information available to a local jurisdiction at the time the NDFE is prepared. It is permissible, however, for a local jurisdiction to include additional information in the NDFE as it deems appropriate (CCR Section 18752[c]). In addition, the introductory section of these regulations indicates that it is allowable to include in the NDFE other facilities not defined as Nondisposal Facilities (CCR Section 18752[d]).

#### Content of the NDFE

The specific requirements for the content of the NDFE are contained in CCR Sections 18753, 18753.5, 18754, and 18754.5. These regulations identify the specific requirements for existing, proposed, or for expanding nondisposal facilities located within and located outside of the reporting jurisdiction. Table A below identifies the specific requirements for each type of facility and facility location.

**Table A**  
**NDFE Planning Requirements For Nondisposal Facilities**

	Located Within Jurisdiction	Located Outside of Jurisdiction
Nondisposal Facility	<p>Must include:</p> <ol style="list-style-type: none"> <li>1) type of facility;</li> <li>2) facility capacity;</li> <li>3) diversion rate or expected diversion rate; and</li> <li>4) participating jurisdictions.</li> </ol> <p>May additionally include:</p> <ol style="list-style-type: none"> <li>1) address of facility; or</li> <li>2) description of the general area.</li> <li>3) other information deemed appropriate by a local jurisdiction</li> </ol>	<p>Must include:</p> <ol style="list-style-type: none"> <li>1) type of facility;</li> <li>2) estimated amount of waste sent to the facility;</li> <li>3) diversion rate or expected diversion rate; and</li> <li>4) location of facility.</li> </ol>
Transfer Station (recovering <5% of total waste received)	<p>Must include:</p> <ol style="list-style-type: none"> <li>1) name of facility; and</li> <li>2) participating jurisdictions.</li> </ol> <p>May additionally include:</p> <ol style="list-style-type: none"> <li>1) address of facility; or</li> <li>2) description of the general area.</li> <li>3) other information deemed appropriate by a local jurisdiction</li> </ol>	<p>Must include:</p> <ol style="list-style-type: none"> <li>1) name of facility; and</li> <li>2) location of facility.</li> </ol>

## **Section 2 Adoption and Amendment of the NDFE**

The following statutory references to NDFEs in the PRC concern the requirements for adopting and amending the NDFE. These provisions include the following:

- The NDFE is not subject to the environmental review requirements of the California Environmental Quality Act (CEQA) (PRC Section 41735[a]).
- After completion of the NDFE, each city is to transmit a copy to the county in which the city is located. Likewise, each county is to submit its NDFE to each city located in the county (PRC Sections 41730 and 41731).
- In addition, prior to adopting or amending an NDFE, a city or county is required to submit its NDFE to the Local Task Force (LTF) for review and comment. These comments are limited to an assessment of the regional impacts of potential diversion facilities. They are to be submitted to the city or county which prepared the NDFE and to the Board within 90 days of the date the LTF receives the NDFE for comment (PRC Sections 41734[a] and [b]).
- The NDFE and any amendments are not required to be approved by any jurisdiction other than the one which prepared the NDFE (PRC Sections 41730 and 41731).
- After local adoption or amendment of the NDFE, it is to be submitted to the Board for review and approval. A copy should also be submitted to the County in which the city is located for inclusion into the Summary Plan for the county. The County also submits its NDFE to each city in the county (PRC Sections 41730, 41731, and 41791.5).
- Cities and counties are not required to revise their previously adopted SRREs to make these documents consistent with subsequently adopted NDFEs. The NDFEs shall be incorporated into the SRREs at the time of the first five-year revision (PRC Section 41736).

**Section 3**  
**MODEL NONDISPOSAL FACILITY ELEMENT**

This section presents a model NDFE for a hypothetical California City. It includes an introductory section explaining the statutory requirement for preparation of the NDFE document, and several fact sheets providing the descriptive information required in an easy-to-read tabular format.

**City Of Sussex**

**Nondisposal Facility Element**

California Public Resources Code (PRC) Sections 41730 et seq, require every California city and county to prepare and adopt a Nondisposal Facility Element (NDFE) for all new Nondisposal facilities, and any expansions of existing Nondisposal facilities, which will be needed to implement local Source Reduction and Recycling Elements (SRREs). A Nondisposal facility is defined as any solid waste facility required to obtain a state solid waste facility permit except a disposal facility or a transformation facility (PRC Section 40151).

The City of Sussex has prepared, adopted and hereby transmits to Gibb County the City's NDFE, as required by PRC Section 41730. The City is also submitting a copy of its NDFE to the California Integrated Waste Management Board for review and approval. The City's NDFE will be appended to the City's SRRE at the time of the five year revision.

This NDFE identifies the utilization of transfer stations, material recovery facilities (MRFs) and a yard waste composting facility as Nondisposal facilities necessary to implement the City's waste diversion goals. Tables M-1, M-2, and M-3, attached, identify the Nondisposal facilities the City intends to utilize to implement its SRRE and meet the solid waste diversion requirements of PRC Section 41780.

A draft of this NDFE was submitted to the Gibb County Local Task Force (LTF) for review and comment regarding the regional impacts of the Nondisposal facilities identified in this Element, in accordance with the requirements of PRC Sections 41734(a) and (b). As indicated by PRC Section 41735(a), the adoption or amendment of this element is not subject to environmental review under the California Environmental Quality Act (CEQA).

**Table M-1  
City of Sussex NDFE  
Slocum Heights Waste Recovery and Transfer Facility  
Fact Sheet**

<b>TYPE OF FACILITY</b>	The Slocum Heights Waste Recovery and Transfer Facility (WRTF) is a proposed new solid waste material recovery and transfer facility which will receive and process loads of mixed waste and source separated recyclable materials.
<b>FACILITY CAPACITY</b>	The Slocum Heights WRTF is designed to process an average of 1,000 tons per day of waste material and will handle a peak capacity of 1,600 tons per day.
<b>EXPECTED DIVERSION RATE</b>	The Slocum Heights WRTF will divert from disposal approximately 17.5 percent of the wastes generated yearly in the City of Sussex based on the following calculations. It is assumed that on average 500 tons of waste, or approximately half of the 1,000 tons of wastes generated daily in Sussex, will be taken to the Slocum Heights WRTF for waste processing. Overall, the Slocum Heights WRTF is expected to divert from disposal approximately 35 percent of the waste material received at this facility. The amount of Sussex waste diverted from disposal by the waste processing activity of the Slocum Heights WRTF is 175 tons per day (35% of 500 tons = 175 tons). This amounts to a rate of diversion of 17.5 percent (175 tons diverted, divided by 1,000 tons generated, = 17.5 percent).
<b>PARTICIPATING JURISDICTIONS</b>	Cities of Sussex, Wessex and Essex and unincorporated Gibb County.
<b>LOCATION</b>	The Slocum Heights WRTF will be located in an industrial area of North Sussex. A specific site for this facility has not yet been identified. Three potential sites in the Slocum Heights area of North Sussex are presently under consideration. An Environmental Impact Report (EIR) is presently being prepared on the Slocum Heights WRTF. It is expected that this effort will identify an environmentally preferred location for this facility.

**Table M-2  
City of Sussex NDFE  
Wildwood Yard Waste Composting Facility  
Fact Sheet**

<b>TYPE OF FACILITY</b>	The Wildwood Yard Waste Composting Facility will serve as the principal large scale regional composting facility for Gibb County and its cities. The facility is owned and operated by Gibb County. The materials to be composted will consist of yard waste, other plant debris, and wood waste fines. These materials will usually be pre-processed in chipping and grinding operations that occur at Gibb County's transfer stations. The composting operations at the Wildwood facility will consist of curing in windrows, post-processing screening to remove oversize material, and storage of the finished product before being removed to markets.
<b>AMOUNT OF WASTE SENT TO FACILITY</b>	Approximately 195 tons per day of yard waste and other compostable material will be sent to the Wildwood Yard Waste Composting Facility from the City of Sussex.
<b>EXPECTED DIVERSION RATE</b>	The Wildwood Yard Waste Composting Facility will divert from disposal approximately 19.5 percent of the wastes generated yearly in the City of Sussex based on the following calculations. The waste generation study performed for the City of Sussex SRRE indicates that yard waste and other compostable material comprise approximately 20 percent of the wastes generated in the City (200 tons per day of the 1,000 tons generated per day of City wastes are yard waste). Approximately 5 percent of the City's total waste stream (5 tons per day) will be diverted from disposal by back yard composting activity. As noted above, the remaining 195 tons per day of yard waste and other compostable material will be sent to the Wildwood Composting Facility. The 195 tons per day of yard waste going to the Wildwood Facility represents 19.5 percent of the total estimated 1,000 tons generated daily in Sussex.
<b>LOCATION</b>	Unincorporated Gibb County; Mountain Road east of the City of Wessex.

**Table M-3  
City of Sussex NDFE  
Pettit Road Transfer Station  
Fact Sheet**

<b>NAME OF FACILITY</b>	The Pettit Road Transfer Station is an existing small-volume transfer station owned and operated by the City of Sussex. This facility handles mainly loads of mixed residential waste brought to the facility by the City's municipal refuse collection vehicles. The City of Sussex is planning an expansion of operations at this facility by adding a second shift of operations. This activity will increase the average daily throughput of this facility from 75 to 150 cubic yards of waste material per day.
	At present there are limited scavenging activities at the Pettit Road Transfer Station, primarily manual picking of aluminum cans from off the tipping floor. In this manner, approximately 3 cubic yards per day of recyclable material are collected. With the expansion of site operations, it is expected that the total volume of materials diverted from landfill disposal will increase to 5 cubic yards per day.
<b>PARTICIPATING JURISDICTIONS</b>	The City of Sussex is the only jurisdiction which utilizes the Pettit Road Transfer Station.
<b>LOCATION</b>	2460 East Grease Street in the southern part of Sussex at the intersection of East Grease Street and Navy Boulevard.

**CALIFORNIA INTEGRATED WASTE MANAGEMENT BOARD**

**RESOLUTION #93 -**

**FOR THE MODEL FOR PREPARING A  
NONDISPOSAL FACILITY ELEMENT**

**Public Resources Code 40912**

**Title 14, Division 7, Chapter 9, Article 6.4**

**WHEREAS,** Public Resources Code Sections 41730 through 41736 requires each jurisdiction to develop a Nondisposal Facility Element; and

**WHEREAS,** nondisposal facilities were excluded from the Countywide/Regionwide Siting Element by the passage of AB 3001, thereby requiring jurisdictions to prepare separate Nondisposal Facility Elements; and

**WHEREAS,** Title 14 of the California Code of Regulations, Sections 18752 through 18754.5 clarifies the required information that jurisdictions must include in their Nondisposal Facility Elements; and

**WHEREAS,** the Board contracted with Environmental Science Associates to develop the model for preparing a Nondisposal Facility Element; and

**WHEREAS,** the model for preparing a Nondisposal Facility Element developed by Environmental Science Associates meets statutory and regulatory requirements; and

**WHEREAS,** the Board has found that the model for preparing a Nondisposal Facility Element provides useful guidance to jurisdictions when preparing their own element.

**NOW, THEREFORE, BE IT RESOLVED** that the Board hereby approves the model for preparing a Nondisposal Facility Element which is titled "How to Prepare a Nondisposal Facility Element".

# **CERTIFICATION**

The undersigned Executive Director of the California Integrated Waste Management Board does hereby certify that the foregoing is a full true and correct copy of a resolution duly and regularly adopted by the California Integrated Waste Management Board on December 15, 1993.

Dated:

Ralph E. Chandler  
Executive Director

CALIFORNIA INTEGRATED WASTE MANAGEMENT BOARD  
LOCAL ASSISTANCE AND PLANNING COMMITTEE  
DECEMBER 7, 1993

AGENDA ITEM 7

**ITEM:** Consideration of staff recommendations and public comments on Weight/Volume Conversion Factor Study for In-Vehicle and In-Place Waste Densities

**BACKGROUND:**

Board staff presented an agenda item at the August 19, 1993 Planning Committee Meeting that discussed the Weight/Volume Conversion Factor Study for In-Vehicle (in-truck) and In-Place (in a landfill) Waste Densities that was conducted by CalRecovery, Inc. The presentation included a summary of the four models developed by the contractor to determine these values. Board staff were directed to circulate their analysis of these models for a 30-day public comment period, and to return to the Planning Committee with results and recommendations.

**ANALYSIS:**

The Conversion Factor Study was based on existing in-truck density studies, field tests, a telephone survey of haulers and manufacturers of various types of waste hauling vehicles, and an extensive literature search.

The contractor developed four models for calculating the standard conversion values: the "Simple Model" and "Model-2" for converting as-delivered in-vehicle volume of solid waste to weight; the "In-Place Density Model" for determining the in-place density of solid waste in a landfill; and the "General Model", which is a combination of both Model-2 and the In-Place Density Model, and therefore, models both in-truck volume and in-place density.

**Findings:** Below are findings of the individual models presented in the report:

**Simple Model:**

- information needed to use the model:
  - . source of waste (e.g., residential/commercial/industrial)
  - . type of hauling vehicle (e.g., front loader, rear loader, etc.)
  - . volumetric capacity of the vehicle
  - . percent-full of the vehicle
- error rate: 8%-13% based on field tests of the model.

**Model-2:**

- information needed to use the model:

- .. type of hauling vehicle (e.g., front loader, rear-loader, etc.)
- .. volumetric capacity of the vehicle
- .. percent-full of the vehicle
- .. composition of the waste in the vehicle

- error rate: 30% to 40%

In-Place Density Model:

- information needed to use the model:
  - .. weight of the compacting machinery
  - .. number of passes made by the compacting machinery
  - .. slope angle of the working face
  - .. set of constants
- error rate: no specifics are given in the report. Limitations on its usefulness, however, will be discussed in the following "Report Evaluation" section.

General Model:

- information needed to use the model:
  - .. same as for the Model-2, plus that for the In-Place Density Model.
- error rate: integrates the Model 2 with the In-place Density Model, so it has the same rate of error as the Model 2, plus the limitations of the In-Place Density Model described in the following "Report Evaluation" section.

**REPORT EVALUATION:**

This study is based on an extensive literature search and several field tests conducted by the contractor. Factors such as the variation in composition of solid waste between jurisdictions, different moisture contents of these wastes, and different operating procedures used at landfills around the state (e.g., large landfills serving urban areas versus small landfills serving rural areas) made it difficult to develop standard conversion values that would be accurate for all jurisdictions.

In-Truck Density - Simple Model

Of the two in-vehicle volume models, staff believes the Simple Model is appropriate for use by jurisdictions. The advantage of the Simple Model is that it is simple to use and requires only information that is easily available to jurisdictions. The model can also be used to estimate amounts of self-hauled waste, which is important for rural jurisdictions, because much of their waste is "self-hauled" to the landfill. Two types of information

necessary for the model that could contribute to its error rate are: 1) the need to know the source of the waste (i.e., whether it is residential, commercial or industrial); and 2) the need for the hauler to accurately estimate the percent-full (percentage of the truck filled with waste) of the truck. From field testing, the model's error was found to be close to 10% - an error generally considered acceptable for models. Therefore, these two potential sources of error seem to contribute an acceptable level of error.

#### In-Truck Density - Model-2

The second in-vehicle volume model, Model-2, had a 30-40% error rate during the field testing. The accuracy of this model is low due to a lack of test data representing the substantial variation in operating conditions among hauling vehicles and of data reflecting the compaction rate of various waste compositions. This high rate of error reduces the validity of the model to such a low level that staff feel the model needs improvement (i.e., additional research) before it can be used to estimate in-vehicle volume statewide.

#### In-Place Density Model

Of the two models developed to estimate the in-place density of waste in a landfill, staff believes the In-Place Density Model is the most useful, under certain conditions. There are limitations to the usefulness of this model, however:

- a) The model was only tested at landfills with:
  - 1) compacting machinery weighing from 30,000 to 90,000 lbs;
  - 2) compacting machinery making 2-9 "passes" over the waste;
  - 3) slope angle of the working face within the range of flat to 2:1.

The model may not be accurate for landfills which do not fall within these parameters.

- b) The "constants" in the model were mathematically manipulated after testing. It is unclear to staff whether to recommend jurisdictions use the original constants or the mathematically manipulated constants when using the model.

Small, rural landfills may have landfill compaction practices that fall outside the range of values tested by the model. For example, they may not have such heavy compacting machinery, or make 2-9 "passes" over the waste. Therefore, use of the model may not obtain accurate estimates at these landfills, which are

the landfills that would most benefit from such a model.

Jurisdictions that use landfills with standard operating procedures that fall within the parameters of the model however may find the models useful.

#### General Model

The General Model was found to be less accurate than the In-Place Density Model. The inaccuracy of the General Model is a consequence of compounding the inaccuracy of Model-2 and the limitations of the in-place Model. This combination of high error and limitations to its usefulness point to the need for more research before this model should be used by jurisdictions for estimating in-place values.

#### Concerns raised by Committee members at the August 19 Planning Committee Meeting:

Committee members raised a concern at the August Planning Committee Meeting that the error of the Simple Model (that is, 10-13%), could result in incorrect estimation of the waste entering the landfill. They were also concerned if, and how this error would effect the 25% diversion mandate.

Based on the results presented in the Study, staff believe that waste stream-related errors can enter in any stage of data collection, and error of -10% in the waste disposed may result in up to 30% of the diversion mandate.

#### Comments received on use of recommended Models are outlined below:

**Comment (1):** Robert Le, of "Local Government Technical Advisory Committee" (LGTAC):

- Staff recommended models have several limitations which restrict the use of models. It is suggested the landfills which do not have scales, rent portable scales, and sample every truck coming into the landfill for one week in winter and one week in summer and extrapolating the data over the year would provide more accurate estimation rather than using the Models.

**Response:** Scale manufacturers and the companies which sell such scales, said that portable scales are not available for rent. Staff were also told by the equipment rental companies that even if the portable scales were available for rent, it would be very costly for jurisdictions to rent and install portable scales (even for temporary use).

**Comment (2):** Denis Keyes, of City of Los Angeles, Department of Public Works:

- When the City of Los Angeles used the "Statistical Analysis Software" (SAS) program to estimate the parameters provided in the study, they obtained a curve different from the curve given in the study;

**Response:** Staff had forwarded this comment to CalRecovery Inc., (the contractor for the study), and their response is: CalRecovery Inc. did not use the SAS program as a means of developing a mathematical model for in-place density estimations. The difference in the CalRecovery Inc. equation of the curve and that given by the City of Los Angeles's analysis might be due to the use of a slightly different form of the equation of the logistic curve, a slightly different set of constants in the equation, or both.

The City of Los Angeles's analysis illustrates that the differences between the City's estimates and the CalRecovery's are minor over the substantial range of input values that were used by the City in its analysis. CalRecovery Inc., notes that their model was shown to be very accurate based on a comparison of predicted results and those reported by 18 landfills that were contacted to verify the accuracy of the model.

**Comment (3):** Tom Horton, of San Joaquin County, Department of Public Works:

- It is stated in the conversion factor study "The list of acceptable conversion factors **will be** used by jurisdictions to convert quantities of solid waste to the units required in Article 6.1 of the Regulations."

However, Title 14, Article 6.1, Section 18722(f)(1) states that "The conversion factors used for measurement of the quantities of solid waste **may be** those from published sources and/or those derived from test measurements developed by a jurisdiction."

Please clarify this inconsistency.

**Response:** Board staff recommend the models developed in the Conversion Factors Study not be required, but only be available as an optional method for determining conversion values for jurisdictions who wish to use them. Jurisdictions would be allowed to use their own conversion factors and/or those developed by others.

Comment (4): Suzanne McClanahan, of Orange County, Integrated Waste Management Department:

- The conversion factors developed in the study should be advisory only.

Local jurisdictions should be allowed to choose any industry-accepted methods of estimating capacity. Also, jurisdictions should be allowed to continue to compute capacity by the same method they used in their Source Reduction and Recycling Elements (SRREs) and Countywide Integrated Waste Management Plans (CIWMPs).

Also, the Board should not devote additional resources to the development of statewide landfill capacity models.

Response: Please see response to comment #3.

Comment (5): Mr. Richard J. Mauck, of the City of Santa Clara, Department of Public Works:

- The Model 2 and the General Model are too inaccurate and would be too difficult to implement, therefore should be disregarded and not an option;
- The Simple Model for the in-vehicle density needs more refinement. The in-truck density estimates from the manufacturers need to be verified, adjusted, or prorated for regional (California) variations.

Response: Board staff recommend the Board not adopt Model 2 and the General Model for use by jurisdictions.

The in-truck densities needed to be used in the Simple Model are not manufacturer-suggested, but are calculated average values based on field tests. Regional variations are due to compositional variations of the waste. Staff agrees that the Simple Model could be refined in future studies.

#### STAFF RECOMMENDATIONS:

Based on these comments and staff's analyses of the models, staff continue to recommend the Board consider making the Simple Model available (not required) to jurisdictions, because it has a relatively low error rate, and is relatively easy to use. The Simple Model was found to be sufficiently accurate when tested at two solid waste facilities in California. Staff also recommend that in the future, the Board re-evaluate the need to refine the Simple Model by taking into consideration the compositional

variation of wastes between jurisdictions.

Staff also recommends the Board consider the In-Place Density Model for use by those jurisdictions using landfills that have compacting machinery that weighs within the range of 30,000 to 90,000 lbs, where the minimum number of passes made by the compacting machinery is in the range of 2 to 9. This model may not be accurate for use by jurisdictions using landfills where the waste management practices do not fit within these ranges.

Staff recommends the Board not adopt Model-2 and the General Model for use by jurisdictions because of the high error rates for these models, which significantly reduce the accuracy of the models, and therefore, reduce their usefulness.

After Board approval of the recommended models, staff recommends the Committee direct staff to prepare a User's Guide to assist jurisdictions in using the Board approved & adopted models. Criteria for the models' use will be specified in the guide.

**ATTACHMENTS:**

Final Report: Conversion Factors For In-Vehicle and In-Place Waste Densities and public comments on the Conversion Factor Study.

Prepared by: Yasmin Satter *JSatter* Phone: 255-2421

Reviewed by: Catherine L. Cardozo *CLC* Phone: 255-2656

Reviewed by: Lorraine Van Kekerix *LVK* Phone: 255-2670

Reviewed by: Dorothy Rice *D. Rice* Phone: 255-2208

Legal review: EB Date/Time: 11/24/93 10:00 a.m.



Public Works Department  
Operations Division

**MEMORANDUM**

September 30 1993

To: Bobbie Garcia, Planning and Analysis office  
California Integrated Waste Management Board

From: <sup>Hung</sup> Robert Le, LGTAC *RL* (415) 496-6913  
*Palo Alto*

Subject: Comments on Conversion Factor Study for In-Vehicle  
and In-Place Waste Densities

1. In-Vehicle Density - Simple Model

This model is simple to use but has several limitations:

- Landfill operator has no control over information needed to use the model. Such information include composition of waste, source of waste and percent - full of the vehicle and are critical for accurate estimation.
- The error rate, 8% to 14% based on field tests, is not acceptable considering that compliance with the AB 939 waste reduction goals (25% by the year 1995 and 50% by the year 2000) is now measured solely by the amount of material disposed.

2. In-Place Density Model

This model looks sophisticated but has several limitations:

- Model Testing is not convincing due to limited data collection.
- Failure to address two important compaction factors such as refuse layer thickness and refuse moisture content.
- Use of this model is limited to landfills which have compacting equipment weighing from 30,000 lbs to 90,000 lbs; compacting equipment making 2 to 9 passes over the waste; and slope angle of the working face within the range of 6:1 to 2:1.
- Error rates, 19% using original constants and 9% using modified constants, are too high for estimating the in-place volume of waste.

RL/dr

# CITY OF LOS ANGELES

CALIFORNIA



RICHARD J. RIORDAN  
MAYOR

October 8, 1993

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Ms. Yasmin Satter  
California Integrated Waste  
Management Board  
Plan Implementation Branch  
8800 Cal Center Drive  
Sacramento, California 95826

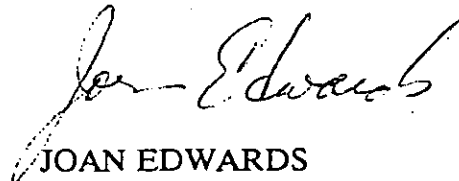
Dear Ms. Satter:

I would like to submit the attached written comments prepared in August by one of my staff members, Denis Keyes, regarding the report entitled "Conversion Factor Study, In-Vehicle and In-Place Densities" by CalRecovery and Tellus Institute.

Denis briefly reviewed the report from the viewpoint of how it affected the current programs of our office in the City of Los Angeles Board of Public Works. He estimated the parameters of the landfill in-place density model himself and found some moderate differences with those contained in the report.

If you need more detailed information on the procedures he used to estimate the model, please feel free to call him at 213/237-0142.

Sincerely,

  
JOAN EDWARDS

JE:DK:dg  
dgymisc@satter

(6) Attachments

August 25, 1993

TO: Joan Edwards

FROM: Denis Keyes

SUBJECT: Summary of Work on CIWMB Article

This is a brief summary of the work I have done so far on the report entitled "Conversion Factor Study, In-Vehicle and In-Place Waste Densities" by CalRecovery and Tellus Institute. The report was sent at your request from the CIWMB.

The densities discussed are those for: (1) in-place at a landfill and (2) in-vehicle for waste refuse trucks. The report does not discuss densities for receptacles. Since the in-vehicle section did not seem applicable to us, I concentrated on the in-place at the landfill section.

A mathematical model was developed to estimate landfill in-place densities in cubic yards based on three main factors: (1) weight of the vehicle used to compact the landfill face, (2) number of passes made by the vehicle and (3) the slope of the landfill face. Without going into detail, the name of the mathematical formulation used was called a General Logistic Model. I worked with this type of model while at the Bureau of Labor Statistics. Based on actual data on vehicles (Table 1) and number of passes made (Table 2), parameters of the model were estimated. The model estimates contribution by vehicle weight and number of passes separately and then combines the factors to get an overall result. The face slope component is not estimated separately.

Based on the information provided in the article, I believe the parameters for the vehicle weight component may have been estimated incorrectly. Graph A (Machine Weight vs. In-Place Density) shows the actual data used (squares) and the model curves (ISWMO and CalRecovery) used to predict waste density from vehicle weight assuming a zero percent face slope. I used SAS to estimate the parameters myself, and came up with a somewhat different curve. For vehicle weights in the 30,000 to 50,000 range there is not much difference, but vehicles with either high or low weights do show a moderate difference. Graph B (Number of Passes vs. In-Place Density) shows almost identical curves for ISWMO and CalRecovery.

To estimate the effect of the differences, I made up a hypothetical table (Table 3) showing different vehicle weights, number of passes, and slope of landfill face. For some categories there are moderate differences of from 10-12% between ISWMO and CalRecovery.

The table shows that the major determinant of landfill density appears to be number of passes, with vehicle weight second. In an appendix to the paper, two minor adjustments were also made for other factors, but I have not incorporated these.

# TABLE 1

Table 2-1. Machine Weight and Density Data

Machine	Machine		Notes	Reference
	Weight lb	Density lb/cu yd		
Slope: Flat				
Number of Passes: 5 <sup>a</sup>				
Deere JD646-C	33746	1020.8		Collord, 1980a
Cat816B	45477	1151.1	Cat Blades	Collord, 1981
Cat816B	45477	1180.05	Caron Teeth	Collord, 1981
Rexnord 3-70	57000	1255.63		Collord, 1979
Rexnord 3-70	57000	1398.77		Collord, 1979
Cat826C	67670	1287.58		Collord, 1980b
Cat826C	67670	1423.57		Collord, 1980b
BomagK701	80325	1246.77		Collord, 1980b
Cat966	53490	1318		New Milford, Waste Management, Inc. 1991

<sup>a</sup> Assumed to be five passes based on analysis of data.

# TABLE 2

Table 2-3. Effect of Equipment Passes Over Waste on In-Place Density (Flat Slope)

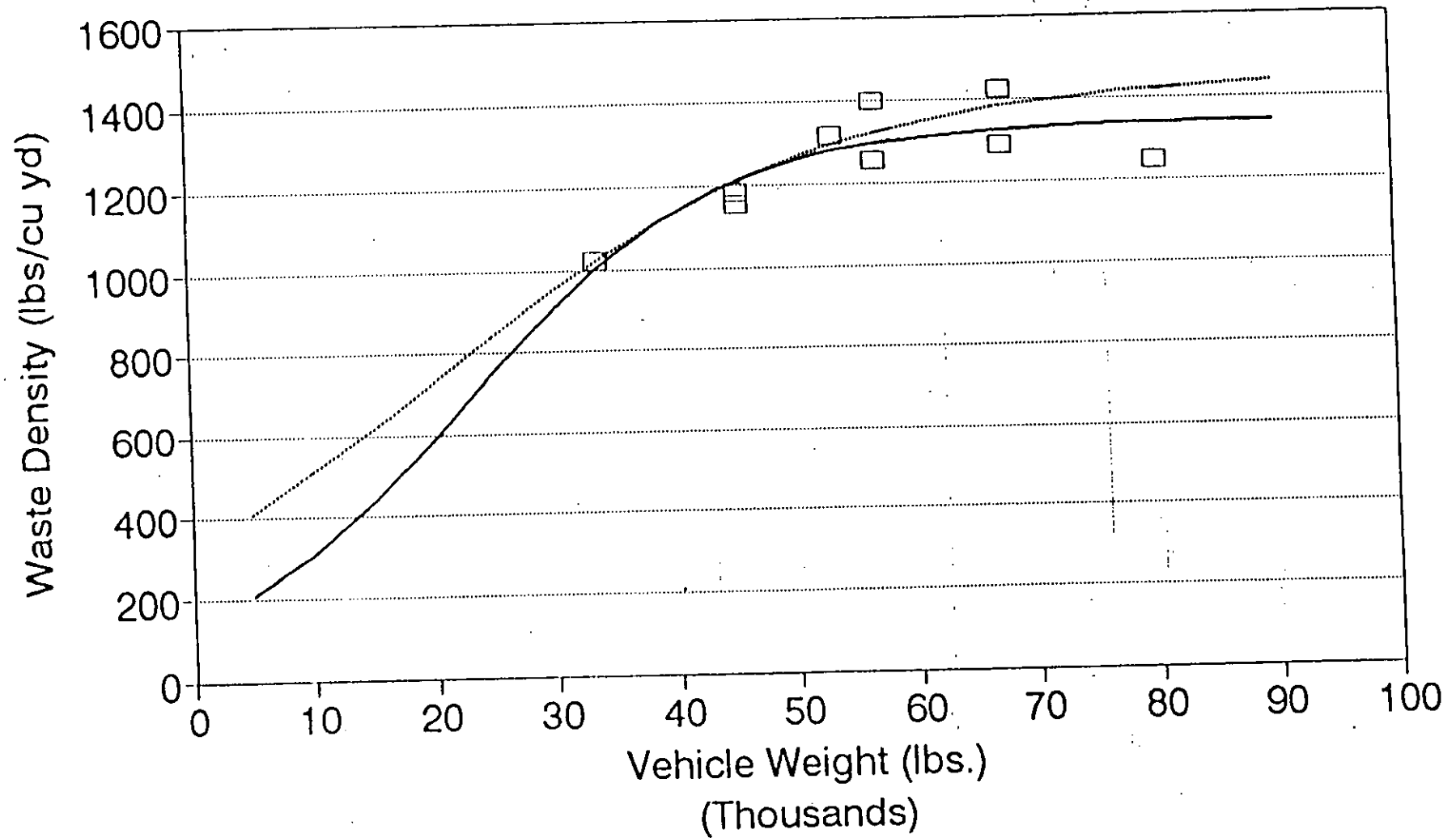
Number of Passes (p)	Density at Pass (p) D(p) (lb/cy)	Change in Density D(p) - D(p-1) (lb/cy)
0	350	-
1	565	215
2	775	210
3	970	195
4	1125	155
5	1225	100
6	1300	75
7	1350	50
8	1375	25
9	1395	20
10	1405	10

Reference: Waste Age, September 1981, Page 66.

# GRAPH A

## Machine Weight vs. In-Place Density

CalRecovery vs. Los Angeles City ISWMO



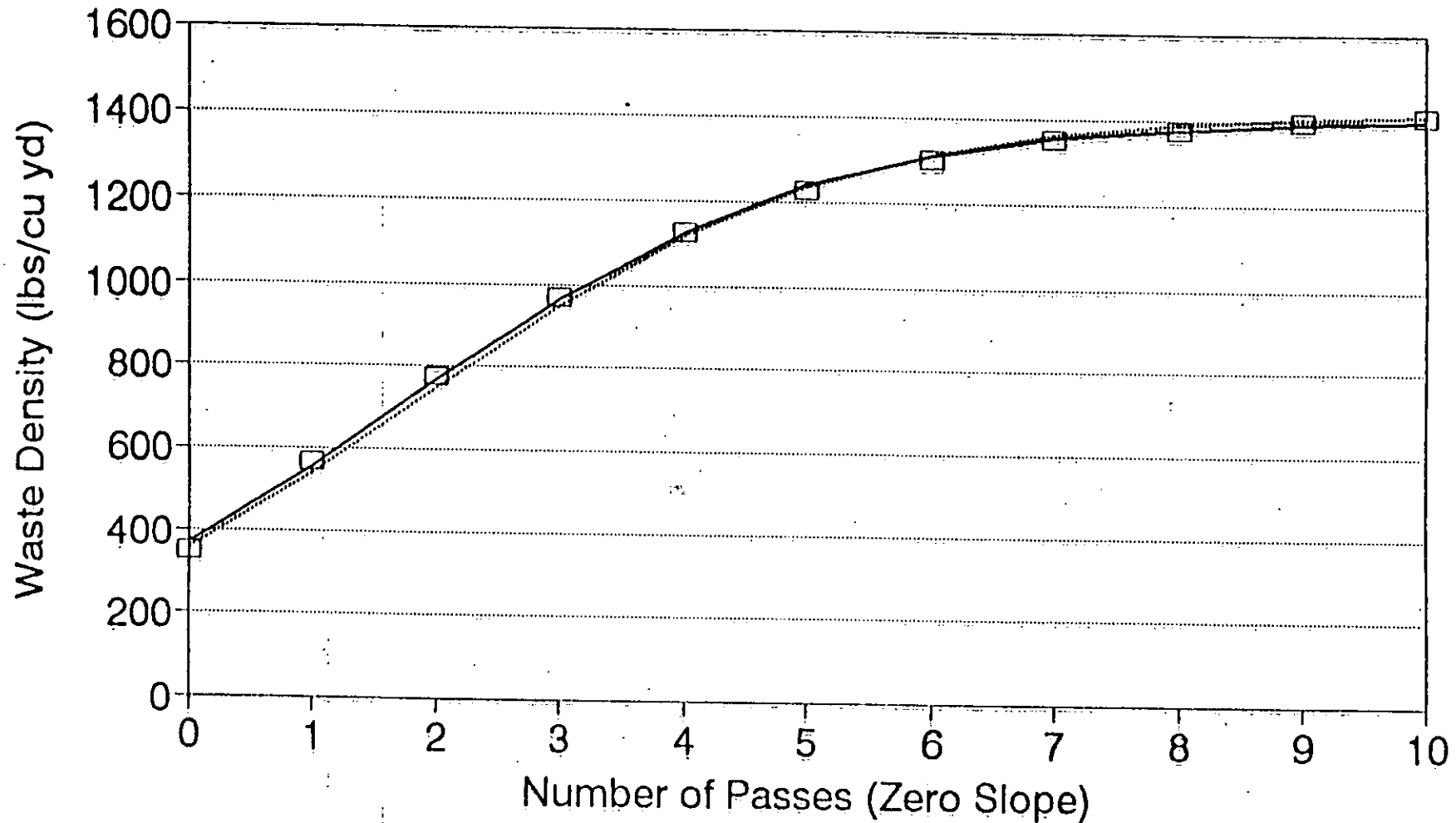
□ Observed Data    ..... CalRecovery    — L A City ISWMO

GRAPH B

165

# Number of Passes vs. In-Place Density

## CalRecovery vs. Los Angeles City ISWMO



□ Observed Data    ..... CalRecovery    — L A City ISWMO

# TABLE 3

Comparison of CalRecovery and L A City ISWMO In-Place Landfill Densities in Cubic Yards  
with Various Vehicle Weights, Face Slope Angles and Number Passes  
25-Aug-93

Vehicle Weight	Face Slope	Number of Passes	In-Place Density (Cubic Yards)		Percent Difference
			L A City ISWMO	CalRecovery	
30,000	0	1	409	415	1.6%
40,000	0	1	513	495	-3.5%
50,000	0	1	568	552	-2.9%
60,000	0	1	593	588	-0.8%
70,000	0	1	602	609	1.1%
80,000	0	1	606	621	2.4%
90,000	0	1	607	627	3.3%
30,000	0	5	911	956	4.9%
40,000	0	5	1,145	1,141	-0.4%
50,000	0	5	1,268	1,271	0.3%
60,000	0	5	1,321	1,354	2.4%
70,000	0	5	1,343	1,402	4.4%
80,000	0	5	1,351	1,429	5.8%
90,000	0	5	1,355	1,444	6.6%
30,000	0	10	1,028	1,091	6.1%
40,000	0	10	1,291	1,301	0.8%
50,000	0	10	1,430	1,450	1.4%
60,000	0	10	1,491	1,544	3.6%
70,000	0	10	1,515	1,600	5.6%
80,000	0	10	1,525	1,631	7.0%
90,000	0	10	1,528	1,648	7.8%
30,000	30	1	353	378	6.9%
40,000	30	1	464	455	-1.9%
50,000	30	1	536	517	-3.6%
60,000	30	1	575	561	-2.5%
70,000	30	1	593	590	-0.7%
80,000	30	1	602	608	1.0%
90,000	30	1	605	619	2.2%
30,000	30	5	788	869	10.3%
40,000	30	5	1,034	1,048	1.3%
50,000	30	5	1,196	1,190	-0.5%
60,000	30	5	1,282	1,291	0.7%
70,000	30	5	1,323	1,357	2.6%
80,000	30	5	1,342	1,399	4.3%
90,000	30	5	1,350	1,425	5.5%
30,000	30	10	889	992	11.6%
40,000	30	10	1,167	1,196	2.5%
50,000	30	10	1,349	1,357	0.6%
60,000	30	10	1,446	1,472	1.8%
70,000	30	10	1,493	1,549	3.7%
80,000	30	10	1,514	1,597	5.4%
90,000	30	10	1,523	1,626	6.7%



Waste management consultants with offices nationwide

November 10, 1993  
File 10644/1310P

Ms. Yasmin Satter  
California Integrated Waste  
Management Board  
Plan Implementation Branch  
8800 Cal center Drive  
Sacramento, CA 95829

Re: Conversion Factor Study/Public Comments

Dear Yasmin:

In connection with your fax of October 14, 1993, we have the following comments to your inquiries:

A) City of Los Angeles

CalRecovery and Tetus did not use the SAS program as a means of developing a mathematical model for in-place density estimations. We assumed a logistic form of the curve, however, as was done in the case of the SAS analysis. The reason for the difference in the CalRecovery/Tetus equation of the curve and that given in the analysis of the City of Los Angeles is probably due to the use of a slightly different form of the equation of the logistic curve, a slightly different set of constants in the equation, or both.

As the City's analysis illustrates, the differences between its estimates and ours are minor over the substantial range of input values that were used by the City in its analyses. We note that our model was shown to be very accurate based on a comparison of predicted results and those reported by 18 landfill facilities that were contacted to verify the accuracy of the model.

B) Miscellaneous Wastes Delivered by Full-size Pickups (724.1 lb/yd<sup>3</sup>)

This value is an average of eight measurements performed in the field. While the result may be perceived to be out of line with the results for the miscellaneous wastes delivered by mini pickups, the result is correct for the loads that we sampled and weighed. We note that the error (49.3%) is large, which reflects a substantial variation in values around the sample mean.

If you have any questions regarding these responses, please feel free to contact me.

Yours truly,

George M. Savage  
Executive Vice President

GMS:od



HENRY M. HIRATA  
DIRECTOR

COUNTY OF SAN JOAQUIN  
DEPARTMENT OF PUBLIC WORKS  
P. O. BOX 1810 - 1810 E. HAZELTON AVENUE  
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(209) 468-3000  
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EUGENE DELUCCHI  
CHIEF DEPUTY DIRECTOR

THOMAS R. FLINN  
DEPUTY DIRECTOR

MANUEL LOPEZ  
DEPUTY DIRECTOR

October 12, 1993

Yasmin Satter  
California Integrated Waste  
Management Board  
8800 Cal Center Drive  
Sacramento, CA 95826-3268

Subject: CONVERSION FACTOR STUDY - IN-VEHICLE  
AND IN-PLACE WASTE DENSITIES

Dear Ms. Satter:

The County has reviewed the report titled Conversion Factor Study - In-vehicle and In-place Waste Densities, and we have the following comment:

In the first paragraph of page iv, it is stated that "The list of acceptable conversion factors will be used by jurisdictions (cities and counties) to convert quantities of solid waste to the units required in Article 6.1 of the Regulations." However, Title 14, Article 6.1, Section 18722(f)(1) states that "The conversion factors used for measurement of the quantities of solid waste may be those from published sources and/or those derived from test measurements developed by a jurisdiction."

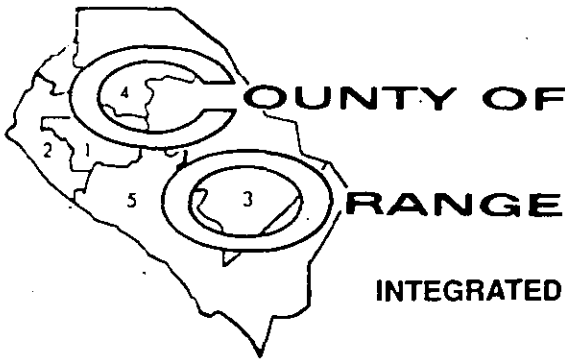
The statement from the subject study is inconsistent with the existing Title 14, Article 6.1, Section 18722(f)(1). It is not clear whether jurisdictions can develop conversion factors or if the Waste Board's acceptable conversion factors must be used. It is recommended that the subject study be revised to be consistent with existing regulations. If you have any questions, please call Gabriel Karam, Senior Solid Waste Engineer, or me at (209) 468-3066.

Sincerely,

  
TOM HORTON  
Solid Waste Manager

TH:WJ:vj  
R:\VIRGINIA\LETTERS\CONVERT.YS

LR 50100



MURRY L. CABLE  
Director

VICKI L. WILSON  
Assistant Director

**INTEGRATED WASTE MANAGEMENT DEPARTMENT**

320 N. Flower Street, Suite 400  
Santa Ana, California 92703  
(714) 834-4000  
FAX (714) 834-4001

October 21, 1993

Ms. Yasmin Satter  
California Integrated Waste Management Board  
Plan Implementation Branch  
8800 Cal Center drive  
Sacramento, California 95826

Dear Ms. Satter:

**SUBJECT: Conversion Factor Study For In-Vehicle and In-Place Waste Densities**

The Orange County Integrated Waste Management Department (IWMD) appreciates the opportunity to comment on the Conversion Factor Study For In-Vehicle and In-Place Waste Densities. It is our understanding that in ordering the study, the goal of the California Integrated Waste Management Board (Board) was to develop a model(s) with standard values for the conversion of weight to volume, and volume to weight, and that the use of the approved model(s) would enable local jurisdictions, especially small landfills, to make an accurate estimate of remaining local and, in turn, statewide landfill capacity.

IWMD offers the following recommendations to the Board:

1. A state developed In-Place Density Model or formula should be advisory only.
2. Local jurisdictions should be allowed to choose any industry accepted method of estimating capacity.
3. Local jurisdictions should be allowed to continue to compute capacity by the same method they used in their Source Reduction and Recycling Elements (SRREs) and Countywide Integrated Waste Management Plans (CIWMPs).
4. Technical assistance in estimating capacity should be given to those jurisdictions that request help.
5. The Board should not devote additional resources to the development of statewide landfill capacity models.

Our reasons are outlined below:

1. It is our opinion that a single statewide standard value for In-Place Density would not lead to increased accuracy of capacity estimates. This is due to the differences in waste compacting equipment, the composition of the waste, landfill siting and operating practices.
2. IWMD is concerned that the recommended formula for In-Place Density could conflict with our present method of estimating capacity which is widely used and accepted in the industry. We use the "topo procedure" in which topographic maps are prepared from aerial photographs taken at prescribed intervals. In-Place Density is computed by comparison of topographic data and the weight in tons of refuse deposited, less cover material used during the prescribed interval.
3. IWMD is concerned that if capacity estimation parameters are changed from those used in the base year of 1990, integrated solid waste plans could require time consuming and costly revisions, closure and post closure funding allocations could be compromised, and achievement of mandated waste reduction and recycling could be threatened.
4. The models suggested in the report are intended to assist small, rural landfills estimate their capacity in the absence of scales and heavy duty compacting equipment. These models may be moot as the targeted small landfills may be forced to close in order to comply with Sub-Title D.
5. There is no perfect method of estimating capacity. The models analyzed in the report are not more representative or effective than other methods presently employed. Scarce resources could be better spent elsewhere.

If you have any questions, please don't hesitate to contact my office. The telephone number is (714) 834-4114.

Sincerely,



Suzanne McClanahan, Manager  
Planning and Compliance Division

cc:

Murry L. Cable, IWMD  
Vicki Wilson, IWMD  
Charlie Niederman, IWMD  
Violet Chu, IWMD

Kevin Kondru, IWMD  
Mike Giancola, IWMD  
Jan Goss, IWMD

# THE CITY OF SANTA CLARA

## CALIFORNIA

STREET DEPT.  
CITY HALL  
1500 WARBURTON AVE.  
SANTA CLARA, CA 95050  
(408) 984-3151  
FAX (408) 241-8291

October 18, 1993

California Integrated Waste  
Management Board  
Plan Implementation Branch  
8800 Cal Center Drive  
Sacramento, Ca 95826

Attn: Yasmin Satter

Dear Ms. Satter:

The following comments concern the Final Report on the Conversion Factor Study for In-Vehicle & In-Place Density:

1. The "Percent of Vehicle Capacity Utilized" can not be accurately estimated by the vehicle driver, exception would be when the vehicle is full and the packer mechanism has reached capacity. Based on how the landfill tipping is charged (weight or volume) may effect how the hauler/driver will respond if it will save money. Does an estimate of capacity utilized increase or decrease the chances of inaccuracy of the model estimate? Also the source of waste would be difficult especially since a significant number of front loaders collect mixed loads from commercial businesses and apartment complexes. This model assumption is flawed and demonstrates the problem that will always be present by allowing refuse hauler vehicle loads not to be weighed.
2. In-Truck Densities estimates from manufacturers are too high for California (semi-arid) area collected refuse. National manufacturers typically base their results on in-house studies conducted in areas of higher precipitation which results in higher compaction rates. My experience indicates, as well as the California studies available, that California in-truck densities can have up to 25% lower average values.
3. The program testing at two solid waste facilities, the limited relevant statistical sampling done by Cal Recovery, and age of studies does not produce enough statistically relevant sampling for analysis. Cal Recovery did not perform its analysis according to accepted statistical practices. This study can not be portrayed as a statistically relevant study and resultant model.

The following comments concern the Final Report on the Conversion Factor Study for In-Vehicle & In-Place Density:

4. The assumption to use a model (Model Z) based on waste composition as one of the basic inputs is flawed and can not be implemented by field personnel with any accuracy or consistency.
5. The "In-place Density" model for landfilling is acceptable given the landfill practices fall within the operating parameters stated. Similar forms have been replicated with reasonable verifications over the last decade. The important item is if at all possible do not couple this model with the In-Vehicle Density models because this will magnify the errors and inaccuracies. Volumetric surveys from aerial photos coupled with a majority of actually weighed loads should be used periodically (every year or two) to verify in-place landfill densities.
6. In Table 1-18 why wasn't a Residential Side Loader Value included? Also why are the values on Table 1-18 an average of the values on Table 1-17 (giving equal weight to each source)?

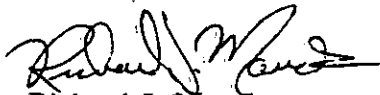
In summary my suggestions are as follows:

- The "In-Place Density" model for landfill compaction is suitable for the application stated but should not be used in conjunction with either of the In-Vehicle Density models as it would compound inaccuracies.
- The General Model compounds inaccuracies is too inaccurate, would be difficult to implement, and should not be used.
- Model 2 for In-Vehicle Density is too inaccurate and would be too difficult to implement, and therefore should be disregarded and not an option.
- The Simple Model for the In-Vehicle Density needs more refinement. The in-truck densities estimates from the manufacturers need to be verified, adjusted, or prorated for regional (California) variations. Suggest the Board (and consultant) should request from the public and private haulers in California if they have verifiable in-vehicle density data that could be used. Suggest reevaluation of the assumption of using an estimate of vehicle capacity actually occupied by the load.

CA Integrated Waste Management Board  
Conversion Factor Study  
Ms. Yasmin Satter  
October 18, 1993  
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- In-Vehicle Density model would be better to include factors for precipitation and time of year.
- Assumption of too heavy an in-vehicle density factor would make it almost impossible to achieve the AB939 goals when trying to take credit for recycling program diversion weights which are typically scaled weights.
- I concur with the findings of the CIWMB Local Assistance and Planning Committee except that additional work needs to be done on the Simple Model.

Yours truly,



Richard J. Mauck  
Deputy Director of Public Works/  
Street Superintendent

RJM:lw

cc: Margaret Rands, County of Santa Clara SWMP

~~RECEIVED~~

Final Report

**CONVERSION FACTOR STUDY  
IN-VEHICLE AND IN-PLACE WASTE DENSITIES**

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## CONVERSION FACTOR STUDY IN-VEHICLE AND IN-PLACE WASTE DENSITIES

### PREFACE

The California Code of Regulations [Title 14, Division 7, Chapter 9, Article 6.1, Section 18722(f) (1) (A)] requires the California Integrated Waste Management Board to complete a study and compile a list of acceptable conversion factors for each specific solid waste type listed in Section 18722(j) by January 1, 1992. The list of acceptable conversion factors will be used by jurisdictions (cities and counties) to convert quantities of solid waste to the units required in Article 6.1 of the Regulations.

Both the legislation and the regulations implementing the legislation mandate that the quantification be based on weight. One method for calculating waste quantities consists of using volume estimations and appropriate bulk densities to estimate weights of materials. Error of estimation is introduced into the procedure in several forms, including those associated with measuring the volume of materials and those associated with accurately determining and using appropriate bulk densities. This report addresses the important issue of defining densities for a) solid wastes collected and transported in a variety of vehicles, and b) for solid wastes compacted at landfill disposal facilities in California. The bulk densities reported herein can be used to convert volumetric data to weight data or vice versa (i.e., the bulk densities serve as the basis for conversion factors between volume and weight). Important applications of the bulk densities and conversion factors relevant to the State's recycling legislation include estimating volumes or weights of disposed and of diverted wastes.

## NOTICE

This report was prepared in fulfillment of California Integrated Waste Management Board Contract No. IWM-C080, for which the total budget was \$168,926.

The statements and conclusions of this report are those of the contractor and not necessarily those of the California Integrated Waste Management Board, its employees, or the State of California. The State makes no warranty, express or implied, and assumes no liability for the information contained in the succeeding text.

## EXECUTIVE SUMMARY

This report describes models for estimating in-vehicle waste densities as well as for estimating in-place densities of waste in landfills. The in-vehicle density models can be used to convert volumetric waste quantities to weights for waste delivered by vehicles to solid waste facilities. The in-place density model can be used to estimate the in-place volume of loose waste compacted under a specified set of conditions.

Prior to the development of the models, an extensive literature search and several field tests were conducted in order to provide a firm base of data for initializing and calibrating the models. The models were developed based on the results of these early activities, fundamental engineering principles, and other empirical data.

Two models for estimation of in-vehicle densities are presented. The Simple Model estimates in-vehicle waste densities based on type of vehicle (e.g., rear loader), the volumetric capacity of the vehicle, and the estimated percent of full capacity actually occupied by the load. The model automatically estimates the total tonnage entering a solid waste facility by summing the results of all of the vehicle entries. As its name implies, the model is simple to use and requires data that can be collected relatively easily at the entry point of a solid waste facility.

The second model, Model 2, is a more sophisticated and therefore, a more complex model than the Simple Model for estimating in-vehicle waste densities and total waste quantities entering a solid waste facility. The model utilizes waste composition as a basic input as well as volumetric capacity of the vehicles and percent of vehicle capacity utilized.

The In-Place Density Model estimates the density of waste in a landfill based on three basic parameters: the weight of the compacting vehicle, the number of passes over the waste, and the slope of the working face. The results of the in-place density model can be used to compute the in-place volume for a specified volume of waste delivered to a solid waste facility. The conditions of the compacting process are specified by the user of the model.

Also presented in the report is a General Model that integrates the more complex in-truck density model, i.e., Model 2, with the In-place Density Model. Combining these two models allows the estimation of in-place density of waste based upon waste composition, as well as the other basic parameters.

All models are fully described in the report along with examples. The report also includes the results of tests to verify the accuracy of the models.

## Section 1

### IN-VEHICLE DENSITIES

#### INTRODUCTION

Densities of solid waste hauled in various types of refuse collection and self-haul vehicles are reported in this study. For the purpose of this study, such densities are termed "in-truck" or "in-vehicle" densities. In-truck densities were identified from the solid waste literature, from a canvassing of various solid waste jurisdictions and collection vehicle manufacturers in the U.S., and from the conduct of field investigations.

CalRecovery developed lists of vehicle manufacturers, haulers, and other potential sources from which to gather as many reliable data as possible within the constraints of the time schedule and the budget for the study. The lists were composed of contacts obtained from CalRecovery files, from industry publications such as Waste Age, and from professional rosters. The gathering of information did not take the form of a survey with a specified population. Rather, the focus was on identifying the best possible data either directly from contacts or from further leads provided by the primary contacts.

Information is discussed in some cases in terms of primary data and secondary data. Primary data, for the purpose of this study, are defined as measured data reported by an investigator or measured data reported by a third party. CalRecovery exercised judgement in forming opinions of what constituted primary data as opposed to secondary data. Secondary data are defined as data of lesser quality than primary data, such as data reported with inadequate information or a lack of reference to test conditions. In keeping with the standard industry convention, all density data are reported in lb/cu yd.

Primary data were gathered from field studies and a review of available literature. The sample data from the very few available field studies yielded averages. Many references reported data in the form of a range. The mean (i.e., average) of the sample data reported in some of these studies was not reported.

The purpose of gathering data from field studies and available literature was to generate as large a base of reasonable data as possible so that useful summary inferences could be made regarding in-vehicle densities by waste type and vehicle type.

The midpoints of the ranges obtained from the literature search were close in most cases to the sample averages identified in the field studies. For this reason, and due to the low number of available studies that reported primary data, the sample averages and the midpoints of the ranges obtained from the literature were averaged.

To the extent that it was available, the information obtained accounts for the sources of waste from various types of waste generators. These sources of waste are categorized as "residential," "commercial," "industrial," and "self-haul," using the definitions established by the

California Integrated Waste Management Board (CIWMB) in Title 14, Chapter 9, Article 3, Section 18720(a).

## **LITERATURE REVIEW AND FIELD DATA ANALYSES**

As required by the scope of work, a comprehensive review of the literature was conducted to determine the existence of primary and secondary data regarding in-vehicle densities of solid waste. Information on in-vehicle densities was collected for several types of trucks and for wastes collected from residential, commercial, industrial, and self-haul sources.

Based on the review, it was found that although there are considerable secondary data available, reliable primary data are few in number. Only the primary data will be reported here. The secondary data are generally within the range of reported values obtained from primary sources, and are viewed as background data only.

Information was collected from California sources as well as from non-California sources. The non-California data generally were similar to the California data as reflected in a comparison among the data. California and non-California in-truck density information was collected to provide a universe of data that would encompass all the types of vehicles and waste sources that could be expected currently or in the next 5 to 10 years in California. In cases where California-specific data are available, these data are used for in-truck analyses. However, since the definition of every waste generator and every vehicle manufacturer and model is outside of the scope of work of the study, non-California data are presented as a resource to draw upon for reasonable estimates of in-truck waste densities where a jurisdiction lacks its own vehicle fleet information or encounters a situation not specifically covered in this report.

### **Residential Sector**

Residential waste is delivered to solid waste facilities (e.g., landfills) primarily in rear loaders, side loaders, or in self-haul vehicles (see Self-Haul). Currently, the predominant vehicle type in California collecting residential waste is the rear loader.

#### **Rear Loaders**

Based on information provided by more than 10 manufacturers of rear loaders (see Table 1-1), in-truck densities range from 600 lb/cu yd to 1200 lb/cu yd. The average of the values reported by the manufacturers is 860 lb/cu yd. Half of these values were between 800 and 900 lb/cu yd. Generally, the information is test data that were gathered in two primary ways. First, several manufacturers reported data that had been gathered through direct observation by research staff from the companies. Second, other manufacturers reported data that had been gathered in the field by users of the equipment. This categorization of how the data were gathered is for the sake of differentiation among sources of data; no differentiation exists between research staff or users in terms of reliability of the reported data. This categorization is also utilized in later sections of the report. The manufacturers that provided information were selected from a list of equipment manufacturers, as discussed in the Introduction.

**Table 1-1. In-Truck Densities (lb/cu yd): Residential Rear Loaders  
(Manufacturers)**

<b>Company</b>	<b>Density<sup>1</sup></b>
Capital Disposal Equipment, Inc. <sup>2</sup>	1050 and 700
Crane Carrier Company <sup>*3</sup>	1000
Dempster, Inc. <sup>*3</sup>	900
G & H Manufacturing, Inc. <sup>3</sup>	up to 800
The Heil Company <sup>*3</sup>	up to 1000 and up to 800
Jaeger Canada Equipment Co. Ltd. <sup>2</sup>	1000-1200 and 800-1000 and 800-1000
Leach <sup>*3</sup>	600-1000
Loadmaster Corporation <sup>3</sup>	1000 and 950-1000 and 700-750
McNeilus Truck & Mfg. <sup>*2</sup>	up to 1000
Peabody Galion/E-Z Pack <sup>*3</sup>	up to 1000 and 900 and 800
Peabody Galion/E-Z Pack <sup>*3</sup>	600
Scranton Manufacturing Co., Inc. <sup>*3</sup>	700-800
Wayne Engineering Corporation <sup>*2</sup>	850 and 800 and 700

<sup>\*</sup>Vehicle known to be sold in California.

<sup>1</sup> Reported densities are national averages; manufacturers could not provide a breakdown of densities by region (e.g., California, non-California).

<sup>2</sup> Source: Field data provided by manufacturers in telephone calls, September and October 1991.

<sup>3</sup> Source: Literature data obtained from Waste Age, June 1991.

### California Data

Four studies conducted in California during the past ten years identified statistically significant sample averages of in-truck densities ranging from approximately 420 lb/cu yd to 680 lb/cu yd (see Table 1-2). The overall average of these averages is approximately 530 lb/cu yd. The sample average from rural Kings County, California (520 lb/cu yd) is within 2% of the overall average of the California studies (both rural and urban) identified in Table 1-2.

The compaction capability of rear loaders has increased considerably since 1970. The most pronounced shift occurred in the period between 1973 and 1978, when several manufacturers introduced high compaction models. This shift was made in response to the post-1973 rise in oil prices, and became a means to reduce the increase in collection costs. The potential influence of the year a rear loader was manufactured on the in-truck density of mixed residential waste is shown in Figure 1-1 using data from field studies conducted in California.

### Non-California Data

Based on primary information provided by three non-California local governments or their consultants (see Table 1-3), in-truck densities range from 410 lb/cu yd to 1200 lb/cu yd.

Based on information provided by six waste haulers (see Table 1-4), in-truck densities range from 810 lb/cu yd to 1000 lb/cu yd. The average of the midpoints of the individually reported ranges is 890 lb/cu yd. Nearly all of the reported ranges cover this average. The process used to select these haulers is discussed in the Introduction.

### Side Loaders

Based on information furnished by more than fifteen manufacturers of side loaders that were chosen randomly (see Table 1-5), in-truck densities range from 300 lb/cu yd to 825 lb/cu yd. The average of the values reported by the manufacturers is 590 lb/cu yd. Approximately half of these values were between 550 and 650 lb/cu yd. Generally, the information is test data that were gathered in two primary ways. First, several manufacturers reported data that had been gathered through direct observation by research staff from the companies. Second, other manufacturers reported data that had been gathered in the field by users of the equipment. The manufacturers that provided information were selected from a list of equipment manufacturers, as discussed in the Introduction.

### California Data

In a field study conducted in 1991 by CalRecovery, the average in-truck density for side loaders operating in Marin County, California, was 464 lb/cu yd. This result is based on 4 samples, and has a 13.8% error.

### Commercial Sector

Commercial waste is normally delivered to solid waste facilities in front loaders. Rear loaders are sometimes used to service commercial generators, e.g., when such generators are dispersed among residential generators or in those cases where small collection vehicles are

**Table 1-2. In-Truck Densities (lb/cu yd): Residential Rear Loaders  
California Local Government Field Studies**

Location	Sample Average	% Error	Number of Samples	Demographics	Source
Alameda County <sup>1</sup>	675	5.0	15	Urban	Cal Recovery Systems, Inc. (1989)
Kings County <sup>2</sup>	521	8.6	8	Rural	Cal Recovery Systems, Inc. (1990)
Marin County	579	6.5	78	Suburban	CalRecovery, Inc. (1991)
Santa Clara County <sup>3</sup>	439	20.4	6	Urban/Suburban	Cal Recovery Systems, Inc. (1983-84)
Santa Clara County <sup>3</sup>	417	30.1	3	Urban/Suburban	Cal Recovery Systems, Inc. (1983-84)
Average 526 <sup>a)</sup>					

a) rounded to 525 lb/yd<sup>3</sup>

<sup>1</sup> Aggregate of three vehicle types.

<sup>2</sup> Side-loader used in residential pick-up.

<sup>3</sup> From different vehicles.

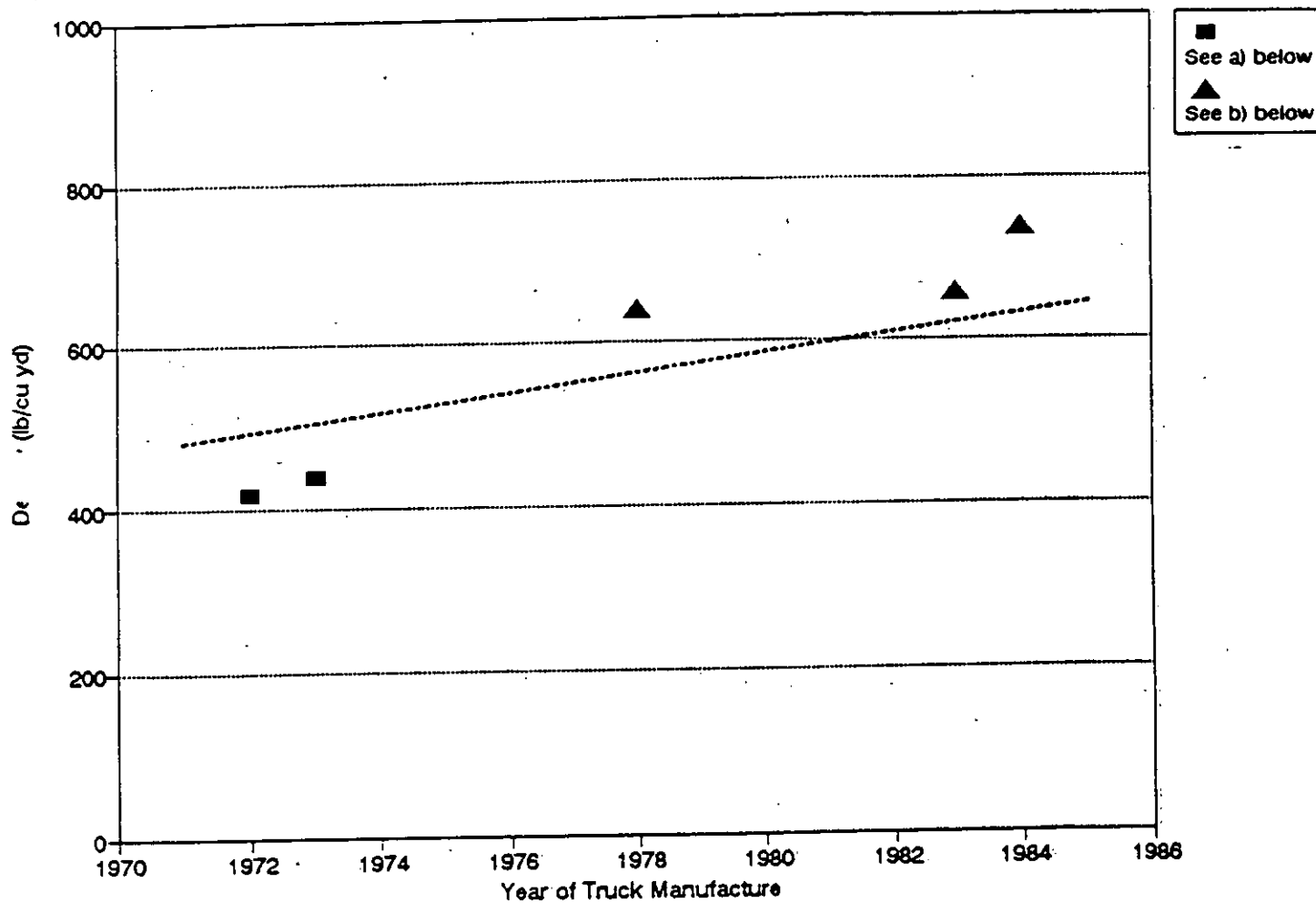


Figure 1-1. In-Truck Density of Mixed Residential Waste vs. Year of Truck Manufacture - Rear Loader

a) Based on vehicle data gathered as part of a 1983-84 comprehensive waste characterization study for North Santa Clara County conducted by Cal Recovery Systems, Inc.

b) Cal Recovery Systems, Inc., Waste Characterization Study for Berkeley, California: First Sampling Period, January, 1989.

**Table 1-3. In-Truck Densities (lb/cu yd): Residential Rear Loaders  
Non-California Local Government Studies**

Location	Range	Midpoint of Range <sup>1</sup>	Demographics	Source
Dakota County, MN	410-630	520	Rural	Pope-Reid Associates, Inc. (1987)
Anoka County, MN	590-810	700	Suburban	Pope-Reid Associates, Inc. (1985)
New York, NY	1000-1200	1100	Urban	City of New York (1991)

<sup>1</sup> Information on the distribution of data points within the range was unavailable.

Table 1-4. In-Truck Densities (lb/cu yd): Residential Rear Loaders  
Non-California Haulers

Range	Midpoint of Range	Source <sup>1</sup>
770-900	840	BFI-Cambridge, MA (1991)
n/a	810	Vining Disposal (1991)
770-1030	900	Lyons Corporation (1991)
900-970	940	Atlantic Waste (1991)
650-1030	840	Sherman Disposal (1991)
840-1160	1000	Dooley Disposal (1991)

Table 1-5. In-Truck Densities (lb/cu yd): Residential Side Loaders  
(Manufacturers)

Company	Density <sup>2</sup>
Able Body Company, Inc. <sup>23</sup>	550-800
Ameritek, Inc. <sup>24</sup>	600-800
Athey Products Corporation <sup>4</sup>	750
Crane Carrier Company <sup>23</sup>	700-800
G & H Manufacturing, Inc. <sup>3</sup>	600-700
Haul-All Equipment Systems <sup>*</sup>	300-350
The Heil Company <sup>23</sup>	up to 650
Labrie Equipment, Ltd. <sup>24</sup>	600-700
Lodal, Inc. <sup>23</sup>	700-825
Martco, Inc. <sup>24</sup>	300-500
Peabody Galion/E-Z-Pack <sup>23</sup>	500-700
Peerless Corporation <sup>24</sup>	600-800
Rapid Rail Systems <sup>24</sup>	635-700
Scranton Manufacturing Co., Inc. <sup>23</sup>	500; and 400-600
Wayne Engineering Corporation <sup>24</sup>	700
Wayne Engineering Corporation <sup>24</sup>	330-350; and 530
Wittker Iron Works Company, Ltd. <sup>24</sup>	475; and 450

\* Vehicle known to be sold in California.

<sup>1</sup> Estimated ranges obtained during telephone conversations with respective haulers. Whether results are based on sample data could not be confirmed.

<sup>2</sup> Reported densities are national averages; manufacturers could not provide a breakdown of densities by region (e.g., California, non-California).

<sup>3</sup> Source: Field data provided by manufacturers in telephone calls, 9-10/91.

<sup>4</sup> Source: Literature data obtained from Waste Age, June 1991.

required due to route limitations. Some commercial waste is delivered to solid waste facilities in roll-off compactors as well.

### **Front Loaders**

In-truck densities for front loaders were provided by approximately 10 equipment manufacturers (see Table 1-6). Based on this information, in-truck densities range from 400 lb/cu yd to 1000 lb/cu yd. The average of the values reported by the manufacturers is 730 lb/cu yd. Approximately half of these values were between 650 and 750 lb/cu yd. Generally, the information is test data that were gathered in two primary ways. First, several manufacturers reported data that had been gathered through direct observation by research staff from the companies. Second, other manufacturers reported data that had been gathered in the field by users of the equipment. The manufacturers that provided information were selected from a list of equipment manufacturers, as discussed in the Introduction.

### **California Data**

Four studies conducted in California during the past ten years identified statistically significant sample averages of in-truck densities ranging from approximately 370 lb/cu yd to 630 lb/cu yd. The overall average of these averages is approximately 480 lb/cu yd (see Table 1-7). This average is similar to that found outside California, as described below. The sample average from rural Kings County, California, (approximately 520 lb/cu yd) is within 8% of the overall average of the California studies (both rural and urban) identified in Table 1-7.

### **Non-California Data**

Based on primary information gathered from two non-California local governments or their consultants (see Table 1-8), in-truck densities range from 280 lb/cu yd to 730 lb/cu yd. The average of the midpoints of the individually reported ranges is 520 lb/cu yd. Each of the reported individual ranges covers this average value. The midpoint of the range reported for rural Dakota County, Minnesota, is within 2% of the average of the midpoints for non-California studies (both suburban and rural) identified in Table 1-8.

One waste hauler reported an in-truck density of 370 to 420 lb/cu yd (A-1 Container, Rehoboth, MA, 1991).

### **Rear Loaders**

In-truck densities for rear loaders that haul commercial waste were obtained from three waste haulers (see Table 1-9). Based on this information, in-truck densities range from 320 lb/cu yd to 970 lb/cu yd. The average of the midpoints of the individually reported ranges is approximately 740 lb/cu yd. These data are estimated to be representative of the range of densities of commercial wastes collected by rear loaders in California. A wide range of densities for commercial collection rear loaders is to be expected given the examples cited previously. Densities for specific locations can vary within the range given in Table 1-9, and site specific data should be used whenever possible.

**Table 1-6. In-Truck Densities (lb/cu yd): Commercial Front Loaders  
(Manufacturers)**

Company	Density <sup>1</sup>
Able Body Company, Inc.* <sup>2</sup>	500-800
Amrep, Inc.* <sup>3</sup>	700
Capital Disposal Equipment, Inc. <sup>3</sup>	800
Crane Carrier Company* <sup>2</sup>	700-1000
Dempster, Inc.* <sup>2</sup>	850 and 700
The Heil Company* <sup>2</sup>	up to 1000
The Heil Company* <sup>2</sup>	up to 1000 (all models)
Lodal, Inc.* <sup>2</sup>	400-500 and 500-600
Lodal, Inc.* <sup>2</sup>	700 and 800
Peabody Galion/E-Z Pack* <sup>2</sup>	600 and 700 and 500
Univ. Handling Equipment Co. Ltd. <sup>2</sup>	650 and 925
Wittke Iron Works Company, Ltd.* <sup>3</sup>	700

\*Vehicle known to be sold in California.

<sup>1</sup> Reported densities are national averages; manufacturers could not provide a breakdown of densities by region (e.g., California, non-California).

<sup>2</sup> Source: Field data provided by manufacturers in telephone calls, 9-10/91.

<sup>3</sup> Source: Literature data obtained from Waste Age, June 1991.

**Table 1-7. In-Truck Densities (lb/cu yd): Commercial Front Loaders  
California Local Government Field Studies**

Location	Sample Average	% Error	Number of Samples	Demographics	Source
Alameda County	631	4.3	22	Urban	Cal Recovery Systems, Inc. (1989)
Kings County	516	11.5	9	Rural	Cal Recovery Systems, Inc. (1990)
Santa Clara County	365	9.2	15	Urban/Suburban	Cal Recovery Systems, Inc. (1983-84)
Santa Clara County	400	10.5	20	Urban/Suburban	Cal Recovery Systems, Inc. (1988)
Average 478 <sup>a)</sup>					

a) rounded to 480 lb/cu yd for use in Table 1-18

**Table 1-8. In-Truck Densities (lb/cu yd): Commercial Front Loaders  
Non-California Local Government Studies**

Location	Range	Midpoint of Range <sup>1</sup>	Demographics	Source
Dakota County, MN	280-730	510	Rural	Pope-Reid Associates, Inc. (1987)
Anoka County, MN	420-640	540	Suburban	Pope-Reid Associates, Inc. (1985)

<sup>1</sup> Information on the distribution of data points within the range was unavailable.

### Roll-Off Compactors

In-truck densities were reported for a few specific commercial sub-sectors. As illustrated in Table 1-10, densities can vary greatly by sub-sector. These densities are judged to be representative of those for similar commercial sub-sectors in California since the loads are relatively homogeneous, i.e., predominantly of one or two waste types.

### Industrial Sector

#### California Data

Industrial waste is delivered to solid waste facilities primarily in roll-off or debris boxes. In a field study conducted in 1991 by CalRecovery, the sample average found in Marin County, California, was 402 lb/cu yd, based on 58 samples. This information is also presented in Table 1-11.

#### Non-California Data

Based on information gathered from local and state governments or their consultants in two states other than California (see Table 1-12), in-truck densities range from 190 lb/cu yd to 500 lb/cu yd. The midpoint of the reported ranges is 400 lb/cu yd. This midpoint is nearly identical to the sample average found in Marin County, as discussed previously.

Information on in-truck densities was gathered from four waste haulers (see Table 1-13). Reported densities range from 250 lb/cu yd to 690 lb/cu yd. The average of the midpoint of the reported ranges is approximately 410 lb/cu yd. The process used to select haulers is discussed in the Introduction.

### Construction and Demolition Materials

Separate information was gathered from six waste haulers on construction and demolition (C&D) materials. This information is presented in Table 1-14. Much of industrial waste consists of C&D materials separated from other waste. The process used to select haulers is discussed in the Introduction.

The average densities reported range from 300 lb/cu yd to 2000 lb/cu yd. This wide range is affected by the type of material being hauled. For example, the density of concrete was reported at 2000 lb/cu yd, while the density of loose wooden boards was reported at 330 lb/cu yd. The overall average for the reported densities is 810 lb/cu yd. Because of the similarity in C&D materials nationwide, these results are judged by CalRecovery to be representative for California as well as for non-California locations.

### Self-Haul

#### California Field Studies

Self-haul waste is delivered to solid waste facilities in small, private vehicles, such as automobiles, pick-up trucks, and small trailers. In one rural county in California, self-haul waste has been determined to have an average density of approximately 260 lb/cu yd, as described in Table 1-15. In suburban Marin County, a field study determined the average density of self-

**Table 1-9. In-Truck Densities (lb/cu yd): Commercial Rear Loaders  
Non-California Haulers**

Range	Midpoint of Range <sup>1</sup>	Source
n/a	970	Vining Disposal (1991)
770-900	840	Atlantic Waste (1991)
320-520	420	Sherman Disposal (1991)

**Table 1-10. In-Truck Densities (lb/cu yd): Commercial Roll-Off Compactors  
Non-California Haulers**

Sub-Sector	Range	Midpoint of Range <sup>2</sup>	Source
Restaurants	800-930	870	E.L. Harvey and Sons (1991)
Grocery Stores <sup>3</sup>	1000-1330	1170	E.L. Harvey and Sons (1991)
Computer Company	150-200	180	E.L. Harvey and Sons (1991)
Tourist/Recreation	n/a	<u>500</u>	E.L. Harvey and Sons (1991)
	Average	680 <sup>4</sup>	

**Table 1-11. In-Truck Densities (lb/cu yd): Industrial Roll-Offs  
California Studies**

Location	Sample Average	Percent of Error	Number of Samples	Source
Marin County	402 <sup>5</sup>	22.1	58	CalRecovery, Inc. (1991)

<sup>1</sup> Information on the distribution of data points within the range was unavailable.

<sup>2</sup> Information on the distribution of data points within the range was unavailable.

<sup>3</sup> Corrugated cardboard removed from measured load.

<sup>4</sup> Value used in Table 1-18

<sup>5</sup> Rounded to 400 lb/cu yd for use in Table 1-18.

Table 1-122. In-Truck Densities (lb/cu.yd) - Industrial Roll-Offs  
Non-California State and Local Government Studies

State	Range	Midpoint of Range	Source
Minnesota	190-500	350	Minnesota Pollution Control Agency (1991)
Maine	n/a	440	State of Maine (1991)

Table 1-133. In-Truck Densities (lb/cu.yd) - Industrial Roll-Offs  
Non-California Haulers

Vehicle Type	Range	Midpoint of Range	Source
Roll-off compactors	n/a	690	Vining Disposal
Roll-off	n/a	450	Vining Disposal
Roll-off compactors	270-330	300	Sherman Disposal
Roll-off compactors	n/a	250	A-1 Container
Roll-off compactors	290-480	380	Reliable

**Table 1-14. In-Truck Densities (lb/cu yd): Construction & Demolition (C&D) Materials  
Non-California Haulers**

Materials	Average	Source
C & D, no rock, dirt, brick	360	Vining Disposal
C & D, with rock, dirt, brick	600	Vining Disposal
C & D, with rock	1330	Lyons
C & D	300	Anytime
C & D	330	Sherman
C & D	1250	Grant
Concrete	2000	Harvey
Boards	330	Harvey

**Table 1-15. As-Delivered Densities (lb/cu yd): Self-Haul Vehicles  
California Field Study - Kings County, Spring 1990**

Vehicle Type	Average Volume of Load <sup>1</sup>	Sample Average <sup>2</sup>	Number of Samples
Pick-up	2.3 cubic yards	261	60
Small trailers	3.3 cubic yards	267	44

Source: Cal Recovery Systems, Inc. 1990.

<sup>1</sup> Based on data from a week-long sampling of self-haul vehicle types by visual estimation.

<sup>2</sup> Based on an average wt/vehicle as weighed in a week-long scale-house sampling program.

haul waste to be approximately 430 lb/cu yd. This region receives considerably more precipitation than rural Kings County. It is presumed that the different densities in these two studies can be attributed in part to the effect of moisture content on in-vehicle density. These different densities can also be attributed in part to differences in waste composition and to the effect of seasonality. The study in Marin County was conducted in the fall, while the one in Kings County was conducted during the spring. Generally, the organic fraction of the waste stream is higher (and wetter) during the fall.

Average densities of self-haul waste were determined through a field study conducted at the Marin Recycling and Resource Recovery Facility. The test plan and data forms for the study are included as Appendix A of this report. Based on the results of this field study, the breakdown of densities for a variety of vehicle types and material categories is given in Table 1-16.

The average density of self-haul waste, based on results from these studies conducted in California, is similar to results from outside California, as described below.

### Non-California Studies

A consultant for one non-California local government (Anoka County, MN) reported a range of 340 to 440 lb/cu yd for average density of self-haul waste (Pope-Reid Associates, 1985).

### Mixed Solid Waste

#### Transfer Trailers

##### California Studies

In those cases where sources of waste generation are remote to disposal sites, mixed solid waste sometimes is transported in transfer trailers to landfills and other ultimate solid waste disposal facilities. In a field study conducted at the Marin Recycling and Resource Recovery Facility, the average density of mixed waste loaded loosely into transfer trailers was determined to be 431 lb/cu yd (4.9% error), based on a sampling of 14 loaded transfer trailers.

### Summary

Information presented in Table 1-17 summarizes all of the California and non-California in-truck density data for residential, commercial, industrial, and self-haul wastes. The data are reported on the basis of three types of primary sources: local governments or their consultants; equipment manufacturers; and waste haulers.

The recommended densities for use as the basis of estimating mixed waste quantities delivered in refuse collection vehicles in California are summarized in Table 1-18. The densities in Table 1-18 can be used in conjunction with waste volume estimates to formulate a simple but accurate predictive model for estimating waste quantities delivered to solid waste facilities.

Recommended densities for self-haul vehicles are shown in Tables 1-15 and 1-16 for rural and urban areas, respectively. No one value for self-haul vehicles is recommended since the bulk density of the wastes vary substantially depending on type of vehicle and waste composition.

**Table 1-16. Marin County, California Field Study: Density Values for Self-Haul Vehicles**

Type of Hauler	Waste Category	Vehicle Type	Sample Size	Average Density lb/cuyd	% Error (a)
Residential	Yard Waste	Mini-pickup	5	273.5	57.5
		Mini-pickup	16	244.8	19.3
	Misc.	Full Size Pickup	7	193.3	35.2
		Full Size Pickup	8	742.1	49.3
Commercial	Misc.	Van	4	376.7	31.5
	Yard Waste	Mini-pickup	16	293.7	27.0
		Misc.	6	533.3	39.1
		C & D	5	574.4	33.8
	Yard Waste	Full Size Pickup	24	315.6	22.0
		Misc.	9	295.0	39.9
		Dirt/Rubble	8	2660.9	26.1
		C & D	9	472.7	31.3
	Yard Waste	Flat Bed	4	354.0	93.2
		Misc.	5	683.2	90.4
		C & D	5	498.4	50.7
	Yard Waste	Dump truck	12	355.9	43.7
		Misc.	4	298.3	65.7
		Dirt/Rubble	3	1083.1	16.0
		C & D	4	623.6	111.2

a) at 90% confidence

Table 1-17. Summary of In-Truck Density Data (lb/cu yd):  
Combined California and Non-California Sources

Waste Source	Vehicle Type	Range	Average <sup>1</sup>	Reporter
Residential	Rear loader	600-1200	860	Manufacturers
Residential	Rear loader	410-1200	620	Local Governments/Consultants
Residential	Rear loader	810-1000	890	Haulers
Residential	Side loader	300-825	590	Manufacturers
Residential	Side loader	400-530	460	Local Governments/Consultants
Commercial	Front loader	400-1000	730	Manufacturers
Commercial	Front loader	280-730	500	Local Governments/Consultants
Commercial	Front loader	370-420	400	Haulers
Commercial	Rear loader	320-970	740	Haulers
Commercial	Roll-off compactor	170-1170 <sup>2</sup>	n/a	Haulers
Industrial	Roll-off	90-980	400	State/Local Governments/Consultants
Industrial	Roll-off	250-690	410	Haulers
Industrial (Construction & Demolition)	Roll-off	300-2000 <sup>3</sup>	n/a	Haulers
Self-haul	Car/Pick-up	260-440	360	Local Governments/Consultants
Mixed	Transfer trailer	n/a	430	Consultants

<sup>1</sup> "Average" includes: a) average of reported values; or b) average of the midpoints of reported ranges.

<sup>2</sup> Varies by sub-sector (see Table 1-10).

<sup>3</sup> Varies by primary material (see Table 1-14).

**Table 1-18. Recommended In-Truck Density Values for Key Waste Sources and Truck Types in California**

<b>Waste Source/Truck Type</b>	<b>In-Truck Density (lb/cu yd)</b>
Residential Rear Loaders	525
Commercial Front Loaders	480
Commercial Roll-Off Compactor	680
Industrial Roll-Off	400

For purposes of volume-to-weight conversion for self-haul waste, jurisdictions should select the value or values from the tables that reflect their specific situation.

For those jurisdictions having vehicle types and waste sources not listed in Table 1-18, the jurisdictions can select the in-vehicle density values from Table 1-17 that most closely reflect the vehicle types and waste sources under consideration. For example, if a jurisdiction desires an in-truck waste density for residential side loaders, the average of the two average values listed in Table 1-17, i.e., 525 lb/cu yd, is a good estimation.

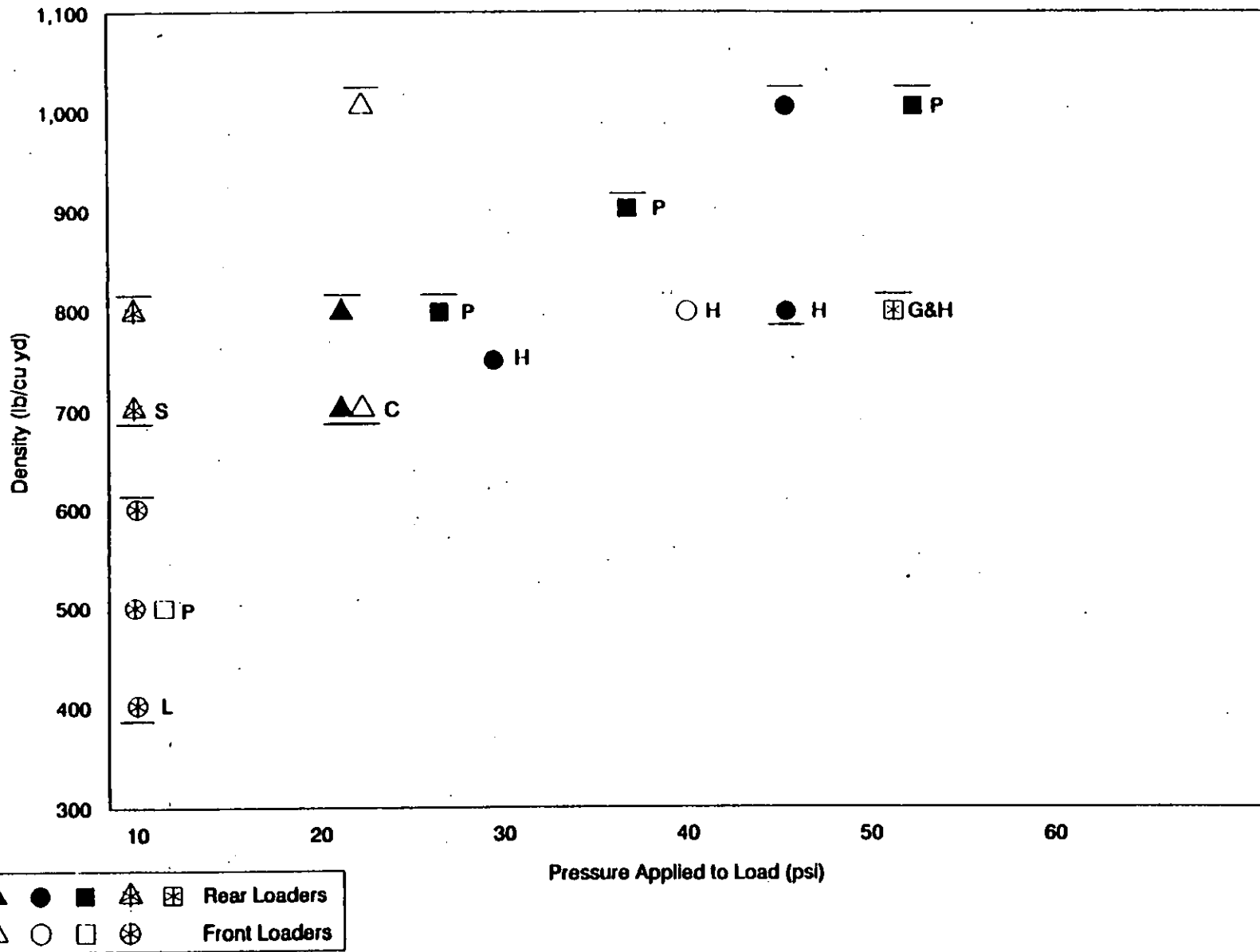
## INFLUENCE OF COMPACTION PRESSURE

In addition to developing and collecting in-truck density data for compaction vehicles, CalRecovery examined the fundamental principles that potentially govern compaction of waste in order to identify variables heretofore not analyzed in the context of in-truck density estimation. Factors that impact the degree of compaction in compaction vehicles include waste composition, moisture content of the waste, and pressure applied to the wastes inside of the vehicle compartment. Of the above factors, the impact of waste composition and moisture content has been demonstrated by the range and average densities reported earlier in this report for residential, commercial, and industrial wastes. The third factor, pressure applied to the load, is an obvious target as a fundamental variable. However, there is a paucity of data available in the literature relating to density and any measure of compaction pressure as it exists in compaction vehicles.

With the above realization, CalRecovery investigated the type and extent of information on the compressive forces and pressures available from manufacturers of compaction vehicles. The intent of the investigation was to identify what, if any, applicable information existed on the forces and pressures applied to waste within the vehicle compartment. Confounding any analysis of the conditions inside a compaction vehicle are the complex mechanical systems that apply the compressive force to the load. For example, multiple stages of compaction in terms of applied pressure and its direction of application on the wastes inside the compartment virtually eliminate the potential of identifying and quantifying a single parameter that represents the magnitude and direction of the applied compressive pressure. In fact, the compressive pressure and thus the density of wastes within the compartment likely varies as a function of locations of the waste in the compartment, even if the mixture is homogeneous. One reason for the variation is the effect of wall resistance (e.g., sidewalls, floor, etc.) on the force applied to the load.

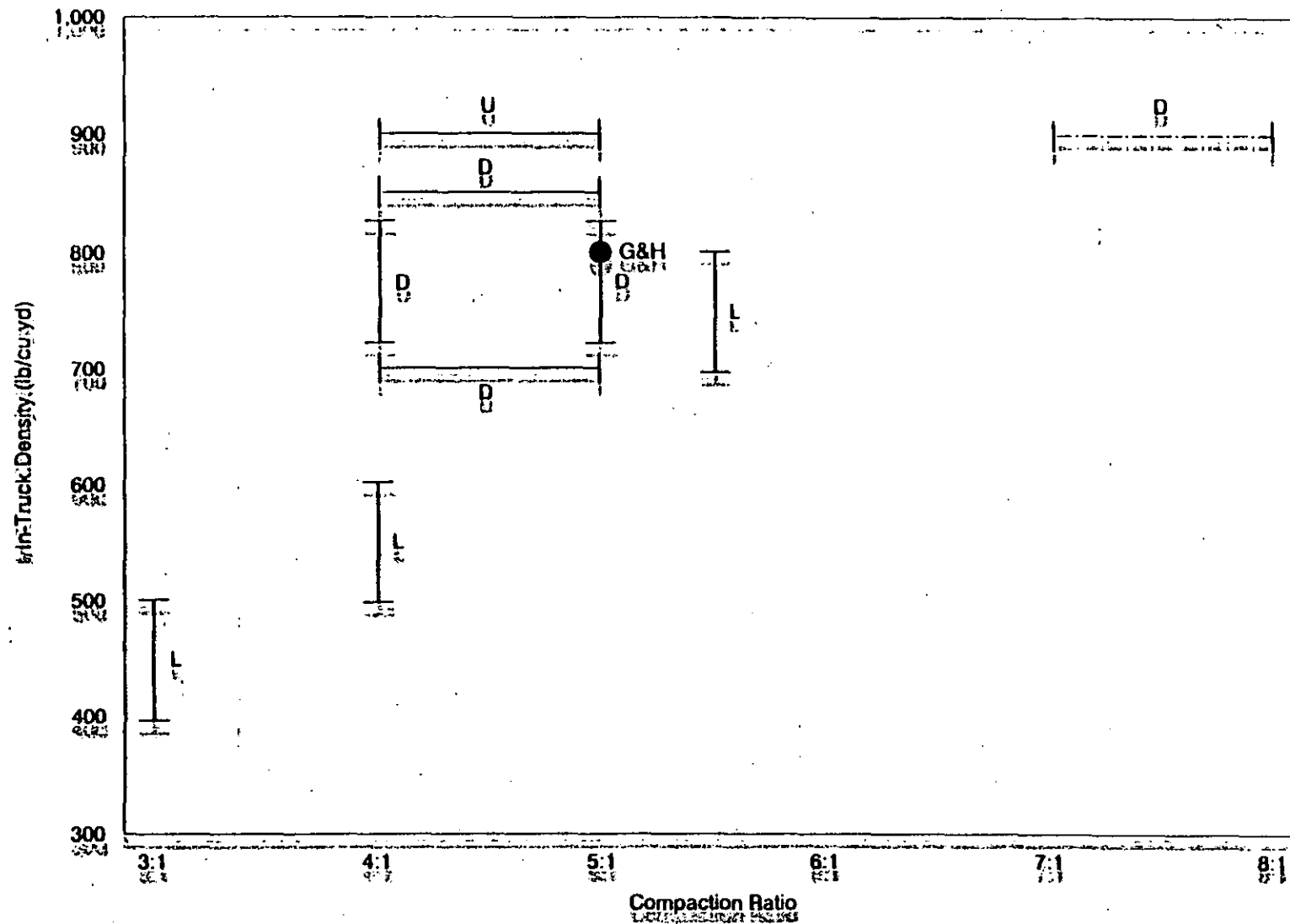
Our survey of manufacturers resulted in the identification and quantification of a pressure parameter, i.e., the pressure exerted by a compactor blade at one end of the load. The manufacturers provided an estimate of the compacted density, compaction ratio, and applied pressure. Compaction ratio is defined as the initial volume of a given mass of wastes divided by the final volume. Taken collectively, the data show a general trend indicating in-truck density increases with applied pressure and compaction ratio. The relationships are illustrated in Figures 1-2 and 1-3, respectively. The trend of the data correlates with the fundamental engineering principle that the density of a mixture increases with applied pressure. This information is also presented in tabular form in Tables 1-19 and 1-20, respectively. The tables and figures presented in this section illustrate the influence of fundamental parameters on in-truck compacted

Figure 1-2. Influence of Applied Pressure on In-Truck Material Density



a) Refer to Table 1-19 for data and manufacturer associated with the letters H, C, L, P, S, and G&H.

**Figure 1-3. Influence of Compaction Ratios on In-Truck Material Density**



Solid Line - Front Loaders  
Dotted Line and Dot - Rear Loaders

a) Refer to Table 1-20 for data and manufacturer associated with the letters L, D, U, and G&H.

**Table 1-19. In-Truck Densities and Applied Pressure on Loads**

**Front Loaders**

Manufacturer	Model	Density (lb/cu yd)	Packing Blade Force (lb)	Packing Blade Force (psi)
Peabody	FL80E	600	125,000	NA
	FLHC80D	700	148,000	NA
	FLSC	500	85,000	12
Lodal	TC or TF-826/1026	400-500/500-600	74,000*	10*
	TC or TF-830/1030	400-500/500-600	74,000*	10*
	TC or TF-834/1034	400-500/500-600	74,000*	10*
	TC or TF-1038/HC	700/800	NA	NA
Dempster	XHD 33/88 / ULTIL40T	700/850	122,000	NA
Heil	HP4-(D)(E)-LW-STD	800	103,000	40
Crane	IFL	700-1000	157,000	22

**Rear Loaders**

Manufacturer	Model	Density (lb/cu yd)	Packing Blade Force (lb)	Packing Blade Force (psi)
Peabody	GL370	up to 1000	120,000	53
	A300	up to 900	80,000	36
	C200E	up to 800	70,000	26
G&H	R90(20)(25)(70)	up to 800	132,000	51
Scranton Manufacturing Company	NewWay RL	700-800	58,000	8
Crane Carrier	ISL**	700-800	157,000	22
Heil	5000	800-1000	NA	45
	4000	750	NA	28

\* Average of 4 stages of compaction.

\*\* Side loader.

Table 1-20. In-Truck Compaction Ratios and Densities

Front Loaders

Manufacturer	Model	Compaction Ratio	Density (lb/cu yd)
Dempster	XHD33/38 / ULTIL40T	4:1 - 5:1	700/850
Lodal	TC or TF-826/1026	3:1/4:1	400-500/500-600
	TC or TF-830/1030	3:1/4:1	400-500/500-600
	TC or TF-834/1034	3:1/4:1	400-500/500-600
	TC or TF-1038/HC	5.5:1	700/800
Universal Handling Equipment	80/40	4:1 - 5:1	900

Rear Loaders

Manufacturer	Model	Compaction Ratio	Density (lb/cu yd)
G&H	R90(20)25)(30)	5:1	up to 800
Dempster	DRK II.20/25/32	7:1 - 8:1	900

densities. In the future, these data may be used to develop fundamental governing equations for waste compaction in vehicles. However, models can be formulated that are of sufficient accuracy without resorting at present to defining equations of state.

## MODELING

The following text describes the development and utilization of the models. Further discussion and examples of use are given in Appendix B.

A simple method to convert data from a volume basis to a weight basis regarding loads of solid waste that are transported to solid waste disposal facilities would allow the CIWMB and local jurisdictions to evaluate local and regional solid waste management trends and issues more comprehensively than is currently possible. A simple model to estimate the weight of a vehicle load is given by the following equation:

$$\begin{aligned}\text{Weight (tons)} &= (\text{in-vehicle density})^1 \times (\text{rated volume of vehicle compartment}) \times (\% \text{ of} \\ \text{load per vehicle} &\quad \text{full volumetric capacity})/100 \\ &= (\text{lb/cu yd} \times \text{ton}/2000 \text{ lb}) \times \text{cu yd} \times (\% \text{ of full volumetric capacity})/100\end{aligned}$$

To make the conversion from volume of material in a vehicle to weight, utilizing the above equation, the following information must be entered:

- The source of the waste
- The type of vehicle
- The volumetric capacity (cu yd) of the vehicle
- The percentage of full capacity occupied by the load

The calculated weight of each load is then summed over all of the vehicles in order to arrive at a total delivered weight of waste.

A post-model validation study was conducted at the Redwood Landfill in Marin County, California, to show that the data presented in this report are representative of field results in California. The study was conducted over two consecutive days in December 1991. This field study was commissioned to test the validity of the simple in-vehicle density model described above against field data collected in California. The field results demonstrate how that the model estimate is within approximately 8% of the quantities measured at the landfill over the two periods. An error of 8% is an acceptable level of error given the fact that previous mass balance studies conducted by CalRecovery under controlled conditions at solid waste facilities yield levels of error of at least 20%.

The results of the validation study are presented in Appendix B. An additional model test was conducted for data collected at the Bee Canyon Landfill. In this case, the results were slightly less favorable with an approximate error of 13%. The results of both of these validation studies are presented in full in the test results section of Appendix B.

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<sup>1</sup> The in-vehicle density factor is based on: A) waste source (i.e., residential, commercial, industrial, and self-haul); and B) vehicle type (e.g., rear loader, front loader).

## Complex Model Description

Several models were developed to incorporate waste composition into the calculation of in-truck compacted density. These models are substantially more complex than the simple model described in the previous section.

The first model, termed the "first order model" assumes that each waste type compacts similarly whether it is being compacted alone or as part of a mixture of waste types. In mathematical notation, let:

$i$  = subscript denoting waste type

$d_i^u$  = uncompact density of waste type  $i$  (before compaction process)

$c_i$  = compacted density of waste type  $i$  (after compaction process)

$p_i$  = percentage by weight of waste type  $i$  in mixed waste batch

Then the first order model assumes that overall compacted density of a mixture of waste types is the sum of the weighted average of the individual material compacted densities, i.e.,

$$(1) \quad D = 1/(\sum_i p_i/c_i)$$

Field tests demonstrated that the first order model somewhat overstates compaction; that is, based on equation (1), predictions of compacted density for mixtures of waste types are greater than the measured bulk density of the mixture. One common observation concerning mixed waste compaction is that glass containers are cushioned by other materials, and glass breakage is less than in the case of compaction of glass only. Compaction of a load of glass containers in a packer truck typically breaks most or all containers, leading to a high compacted density.

These observations concerning the behavior of glass containers undergoing compaction in a matrix of other waste types suggest an extension of the first order model to a second order model. For each waste material, define the "zero compaction percentage" as:

$z_i$  = maximum value of  $p_i$  at which no compaction of material  $i$  occurs in mixed waste

Based on observation in the field, a value of  $z_i = .3$  (i.e., 30%) for glass containers, and 0 for most other materials is deemed accurate.

For a waste type such as glass containers,  $c_i$ , the compacted density of the homogeneous waste type, does not accurately reflect the compacted density of glass in mixed waste. Instead, when  $p_i < z_i$ , the uncompact density  $d_i^u$  is the accurate density value (cushioning is complete, and no compaction occurs). When  $p_i > z_i$ , the compacted density increases toward a limit of  $c_i$  when  $p_i = 1$ . For  $z_i < p_i < 1$ , the compacted density is a weighted average of  $d_i^u$  and  $c_i$ .

To express this relationship, a scaling variable is defined and is used only for those material types that behave like glass under compression, i.e., the variable ranges from 0 at  $p_i = z_i$  to 1 at  $p_i = 1$ .

$$q_i = \begin{cases} 0 & \text{if } p_i < z_i \\ (p_i - z_i) / (1 - z_i) & \text{if } p_i \geq z_i \end{cases}$$

The parameter  $q_i$  designates the fraction of possible compaction of glass (or other materials with  $z_i > 0$ ) which occurs in a given load of mixed waste.

Defining the mixed-compaction density  $m_i$  of waste type  $i$  in a mixed waste batch,

$$(2) \quad m_i = \begin{cases} c_i & \text{if } z_i = 0 \quad (\text{use compacted density except for glass}) \\ (1 - q_i)d_i + q_i c_i & \text{if } z_i > 0 \quad (\text{for glass, use weighted average of compacted, uncompacted densities}) \end{cases}$$

Finally, substitution into equation (1) yields,

$$(3) \quad D = 1 / (\sum_i p_i / m_i)$$

Equation (3) differs from (1) only for those wastes for which  $z_i > 0$ . In those cases, the compacted density of material type  $i$ ,  $c_i$ , is replaced by a weighted average of  $c_i$  and the uncompacted density  $d_i$ ;  $q_i$ , as defined above, is the fraction of the complete compaction of waste type  $i$ . A high value of  $z_i$ , through its influence on  $q_i$ , implies a high degree of cushioning, and a relatively low degree of compaction, of waste type  $i$  in a mixture of waste types.

### Data Collection and Model Testing

The second order in-truck density model presented above predicts a compacted density of 688 lb/cu yd for a California default waste composition and material densities which are presented in the test results section of Appendix B. The California default waste composition and material densities are given in Appendix B. To obtain data on in-truck density of solid waste, 30 California landfills were contacted. Redwood Landfill in Novato (Marin County) agreed to provide truck weight and volume data. In testing the model, a Marin County waste composition was analyzed and the model estimated an in-truck compacted density of 724 lb/cu yd, as appears in Table 1-21. Table 1-22 presents the data supplied on the 103 truckloads which Redwood Landfill received on December 11 and 12, 1991. On average, the predictions of the in-truck density model for the default waste stream were accurate to approximately 20%.

Table 1-21

## IN-TRUCK DENSITY MODEL

Estimated density (lb/cu yd):

724

Marin County

Material Type	Waste stream		Density		Zero		Intermediate	
	Percent by weight	uncompacted (lb/cu yd)	compacted (lb/cu yd)	Compaction Percentage	calculations			
	p	d	c	z	q	m	p*m	
<b>Paper:</b>								
Corrugated Containers	5.90%	33	360		0.06	359.75	21	
Mixed Paper	4.40%	484	613		0.04	612.50	27	
Newspaper	1.30%	323	552		0.01	551.50	7	
High Grade Ledger	9.40%	364	644		0.09	644.00	61	
Other Paper	9.70%	570	635		0.10	635.00	62	
<b>Plastics:</b>								
HDPE	0.30%	35	264		0.00	263.75	1	
PET	0.20%	39	182		0.00	182.00	0	
Film Plastics	4.00%	23	226		0.04	226.00	9	
Other Plastics	4.00%	50	372		0.04	371.62	15	
<b>Glass:</b>								
Recyclable	2.90%	455	1258	30%		455.38	13	
Non-recyclable	0.20%	566	1258	30%		566.00	1	
<b>Metals:</b>								
Aluminum Cans	0.30%	91	399		0.00	399.00	1	
Ferrous	2.50%	141	501		0.03	501.00	13	
Non-Ferrous	0.60%	1248	1248		0.01	1248.32	7	
White Goods		255	255			255.40		
<b>Organics:</b>								
Yardwaste	17.00%	292	584		0.17	584.20	99	
Other Bio-organic	11.60%	1013	1080		0.12	1080.00	125	
Other Nonbio-organic	6.15%	540	648		0.06	648.00	40	
Textiles	1.20%	247	540		0.01	540.00	16	
Leather	1.20%	380	759		0.01	759.30	9	
Woodwaste	6.80%	333	333		0.07	332.65	23	
<b>Other Waste:</b>								
Inert Solids	7.80%	1975	1975		0.08	1974.65	154	
HHW	0.40%	1523	1523		0.00	1522.70	16	
<b>Special Wastes:</b>								
Sewage Sludge		1294	1294			1293.75		
Ash	1.70%	1350	1350		0.02	1350.00	23	
Auto Shredder Waste		800	800			800.00		
Dewatered Sludge		1615	1615			1614.60		
Tannery Sludge		NA						
Drilling Mud		NA						
Mine Tailings		NA						

TOTAL

99.55%

TOTAL COMPACTED DENSITY

724

Source: Marin County Solid Waste Management Plan, Beck &amp; Assoc., Table 2.4, 8/91.

Table 1-22

## IN-TRUCK DENSITY MODEL: Redwood Landfill, Marin County

December 11, 1991

Estimated In-Truck Density:

RL	FL	CRO	OTR	Units
724	525	480	680	400 (lb/ cu yd)

#	Truck Type	Capacity (cu yd)	% Full	Simple Model		Model 2	Incoming weight	Tare weight
				Actual weight (lb)	Estimated weight (lb)	Estimated weight (lb)		
1	RL	20	100%	11,520	10,500	14,476	38,080	26,560
2	OTR	30	80%	6,180	9,600	17,372	30,820	24,640
3	FL	42	100%	36,480	20,160	30,401	55,260	18,780
4	RL	18	75%	7,320	7,088	9,772	27,860	20,540
5	RL	16	100%	6,960	8,400	11,581	26,460	19,500
6	OTR	20	75%	27,620	6,000	10,857	54,000	26,380
7	RL	18	100%	5,820	9,450	13,029	28,180	22,360
8	RL	10	100%	2,720	5,250	7,238	18,540	15,820
9	RL	18	80%	6,080	7,560	10,423	27,200	21,120
10	RL	20	80%	14,260	8,400	11,581	45,120	30,860
11	RL	15	100%	7,880	7,875	10,857	28,460	20,580
12	FL	42	100%	3,580	20,160	30,401	40,020	36,440
13	RL	25	80%	13,540	10,500	14,476	42,340	28,800
14	FL	38	80%	11,240	14,592	22,004	43,680	32,440
15	OTR	18	80%	2,060	5,760	10,423	23,680	21,620
16	RL	25	80%	12,940	10,500	14,476	41,900	28,960
17	RL	20	80%	11,620	8,400	11,581	37,700	26,080
18	RL	20	80%	3,300	8,400	11,581	24,340	21,040
19	RL	20	100%	8,180	10,500	14,476	34,700	26,520
20	RL	25	80%	14,960	10,500	14,476	45,240	30,280
21	RL	20	100%	15,300	10,500	14,476	45,580	30,280
22	RL	25	80%	7,820	10,500	14,476	40,020	32,200
23	OTR	15	100%	9,900	6,000	10,857	36,220	26,320
24	OTR	15	90%	2,640	5,400	9,772	23,780	21,140
25	OTR	20	100%	5,020	8,000	14,476	29,860	24,840
26	RL	25	80%	13,020	10,500	14,476	44,860	31,840
27	OTR	40	0.8	7,340	12,800	23,162	33,720	26,380
28	RL	25	80%	14,000	10,500	14,476	44,060	30,060
29	CRO	15	100%	11,560	10,200	10,857	40,140	28,580
30	RL	20	75%	14,380	7,875	10,857	44,900	30,520
31	CRO	20	80%	9,440	10,880	11,581	38,080	28,640
32	FL	42	100%	15,920	20,160	30,401	52,500	36,580
33	CRO	20	80%	8,620	10,880	11,581	37,620	29,000
34	RL	20	80%	11,020	8,400	11,581	39,820	28,600
35	RL	20	100%	13,220	10,500	14,476	41,820	28,600
36	RL	20	80%	5,480	8,400	11,581	34,320	28,840

Table 1-22

N-TRUCK DENSITY MODEL: Redwood Landfill, Marin County

Day: December 11, 1991

Estimated In-Truck Density:

	RL	FL	CRO	OTR	Units
	724	525	480	680	400
					(lb/cu.yd)

#	Truck Type	Capacity (cu.yd)	% Full	Simple Model		Model 2	Incoming weight	Tare weight
				Actual weight (lb)	Estimated weight (lb)	Estimated weight (lb)		
37	RL	15	75%	10,600	5,906	8,143	37,400	26,800
38	RL	20	75%	9,280	7,875	10,857	36,660	27,380
39	RL	25	60%	15,260	7,875	10,857	48,120	32,860
40	RL	15	80%	4,660	6,300	8,686	24,100	19,440
41	RL	20	100%	13,480	10,500	14,476	41,940	28,460
42	RL	20	75%	9,420	7,875	10,857	39,960	30,540
43	RL	25	80%	13,900	10,500	14,476	45,500	31,600
44	RL	20	100%	7,460	10,500	14,476	35,760	28,300
45	RL	18	75%	6,900	7,088	9,772	28,320	21,420
46	RL	20	80%	7,900	8,400	11,581	31,080	23,180
47	RL	20	75%	10,060	7,875	10,857	38,440	28,380
48	RL	20	75%	8,820	7,875	10,857	34,360	25,540
49	RL	20	80%	11,080	8,400	11,581	36,340	25,260
50	RL	25	60%	13,940	7,875	10,857	45,580	31,640
51	OTR	48	100%	11,720	19,200	34,743	38,380	26,660
52	RL	25	100%	15,540	13,125	18,096	45,800	30,260
53	FL	38	80%	12,220	14,592	22,004	44,760	32,540
54	RL	18	0.75	8,720	7,088	9,772	29,280	20,560
55	RL	18	1	9,500	9,450	13,029	31,780	22,280
56	RL	18	100%	10,560	9,450	13,029	33,020	22,460
57	OTR	50	100%	16,520	20,000	36,191	43,200	26,680
58	RL	18	100%	11,040	9,450	13,029	32,280	21,240
59	OTR	20	80%	4,020	6,400	11,581	30,140	26,120
60	RL	25	90%	10,520	11,813	16,286	39,780	29,260
61	OTR	15	100%	1,900	6,000	10,857	24,580	22,680
62	OTR	15	80%	2,580	4,800	8,686	24,000	21,320

Daily Total Weights:

636,640

607,300

886,212

PERCENT ERROR:

-4.61%

39.20%

Conversion Factor: Study In-Vehicle and In-Place Waste Densities, Table 1-18

One striking characteristic of the reported data is the wide range of densities, from 30 to 1841 lb/cu yd. Of the 103 truck loads, 14 had reported densities under 300 lb/cu yd, suggesting either specialized loads of light-weight materials, little or no compaction, and/or reporting errors. At the other extreme, 11 truck loads reported densities over 900 lb/cu yd, suggesting unusually heavy materials, unusually high compaction, and/or reporting errors. Of the 11 truck loads reporting over 900 lb/cu yd, 9 reported that the truck was 75% or less full; most other trucks were reported as 80% or more full. If weight is reported correctly, but the percent of full volumetric capacity is understated, the density will be correspondingly overstated. Thus it is possible that some of the highest reported densities might reflect errors in estimation of the percent of full load. Deletion of suspect data would result in an error of less than the 20% range mentioned above.

The second order in-truck density model is relatively insensitive to waste composition within the range of compositions that can be reasonably expected. In those cases where unusual waste characteristics can be expected, e.g., very wet waste or waste containing large percentages of inert fines, verification of model predictions should be considered.

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## Section 2

### IN-PLACE DENSITY MODEL

#### INTRODUCTION

##### General

This section of the report presents the methodology used to produce a mathematical model of in-place landfill density using primarily density data available from field studies. The development of the model is based on empiricism as well as certain fundamental governing principles. The model is presented both graphically and in terms of mathematical formulations. The impact of varying several landfill operating parameters is also discussed.

This model can be applied to predict the in-place volume of a known quantity (tonnage) of waste on the basis of fundamental parameters of weight of landfill compaction equipment, number of passes, and slope of the landfill working face. The model can also be used to estimate delivered quantity from the change in landfill volume over a known period as a function of the aforementioned parameters.

In-place landfill density has been reported by various investigators. Reports have included information on the density of mixed solid waste in landfills based on one of two principal estimating techniques:

- Annual change in topographic contours of the landfill and annual tonnage delivered.
- Specific tests designed to determine density, which usually include one to three days' landfilling operation with survey of final contours and test tonnage.

Based on previous studies and a literature review, the fundamental parameters that govern in-place solid waste density were initially identified as including variables grouped according to the following list:

##### A. MSW related parameters, including:

- weight of waste delivered
- composition
- moisture content

##### B. Landform of the waste pile, including:

- slope
- waste depth

C. Equipment-related parameters, including:

- compaction method
- type of compaction equipment
- number of equipment passes
- equipment weight
- pressure at the point of contact

### MSW-Related Parameters

Of the MSW factors, most previous studies report the composition of the waste under consideration in only the most general terms. For example, Collord's December 1979 Orange County tests indicate that the test was conducted with "Group 2 wastes."<sup>1</sup> Two years later, at Stanislaus County, Collord reports commercially-collected "Group 2 wastes" with minor amounts of "Group 3" but with construction and demolition, tires, woody yard waste, septage, drilling muds, and cannery waste excluded. No water was added in any of the tests conducted by Collord.

In addition to the data reported by Collord, more recent data from studies conducted in Connecticut, Rhode Island, and Vermont are less specific with respect to composition. Waste is reported as "mixed waste, residential waste, or commercial waste" only.

### Landform Parameters

Of the landform or topographic factors, isolation of the degree to which slope and waste depth affect in-place density has not been reported with great care in the previous investigations. Where slope has been reported, it has most commonly referred to the maximum slope that the inclined sides of the waste pile are permitted to achieve. Thus, in cases where the in-place density has been reported on the basis of annual data, as in New Milford, Connecticut and Johnston, Rhode Island, the slope should be understood to reflect the general sideslopes of the fill and not the density achieved by compacting directly on such a slope.

Based on in-house information and discussions with landfill managers, waste depth appears to influence compacted density in two ways. Waste that is compacted against the base of a landfill may achieve a slightly higher density upon initial compaction relative to upper lifts. Two factors may contribute to this effect: the unyielding nature of the prepared landfill base and the absence of voids that remain in waste after compaction. Thus, a difference could be expected between the data from test cells (i.e., Vermont and Collord) and annual data from Rhode Island and Connecticut. This potential difference is discussed further in a later subsection.

A second influence of waste depth on density is the consolidation of the lower levels of waste that occurs over time as additional upper lifts are added. The effect of the additional weight that is added to the landfill can be substantial. For example, a large, privately operated New Jersey landfill that is currently more than 100 ft high has periodically shown only 5 ft of

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<sup>1</sup> The category "Group 2 wastes," as defined by the California Solid Waste Management Board, the predecessor agency to the CIWMB, includes mixed municipal solid wastes.

elevation change after the completion of a 10-ft lift because of consolidation of the lower waste layers. Since, however, the Board's stated objective in this study is the determination of waste density in the upper layers of landfills, no further consideration has been given to consolidation of lower landfill layers.

### Equipment-Related Parameters

Of the equipment related parameters cited above, compaction method and type of equipment affects density most directly. Thus, landfills that place and compact waste using bulldozer-type tracked equipment typically achieve the lowest in-place density because of the low bearing pressure exerted by the equipment. This observation is supported by reference to the design of tracked equipment in general, i.e., that it is designed to float on the surface of soft soils to avoid sinking that would result from compression of the soils. Alternatively, landfills that employ specially designed compactors generally achieve higher in-place densities than do those using dozers. Wheeled compactors (designed to achieve high bearing pressures) are usually equipped with steel wheels with cleats. Cleats are advertised as creators of high pressure at the point of contact with the waste.

Equipment weight is most obviously the critical variable once equipment type is selected. As shown in a later subsection of this report, within certain limits, increasing machine weight results in higher densities. For each generic machine type (i.e., landfill compactor), a value can be determined that represents the upper limit of density that can be achieved.

The number of passes of the equipment over a given section of waste has been shown in the literature to affect density up to approximately five passes. Beyond five passes, it is likely that the impact and the cost of the passes by the equipment is not offset by the incremental increases in in-place density.

The following section presents the mathematical relationship of the variables to in-place densities of wastes compacted in a landfill.

## **IN-PLACE DENSITY MODEL**

In this section we present a mathematical model combining three of the most important, easily quantified influences on the in-place density of landfilled waste: weight of the compacting equipment, surface slope, and number of passes made by the compacting equipment. (Model parameters are estimated based on previously published quantitative field test data.) All three factors influencing in-place density are combined in a single equation at the end of this subsection, and are presented in an easy-to-use spreadsheet model. The following text describes the development and utilization of the models. Further discussion and examples of use are given in Appendix B.

### **Model Description**

#### Machine Weight

Figure 2-1 and Table 2-1 present the available information relating the weight of compacting equipment to the in-place density. The data are based on five passes by the vehicle over

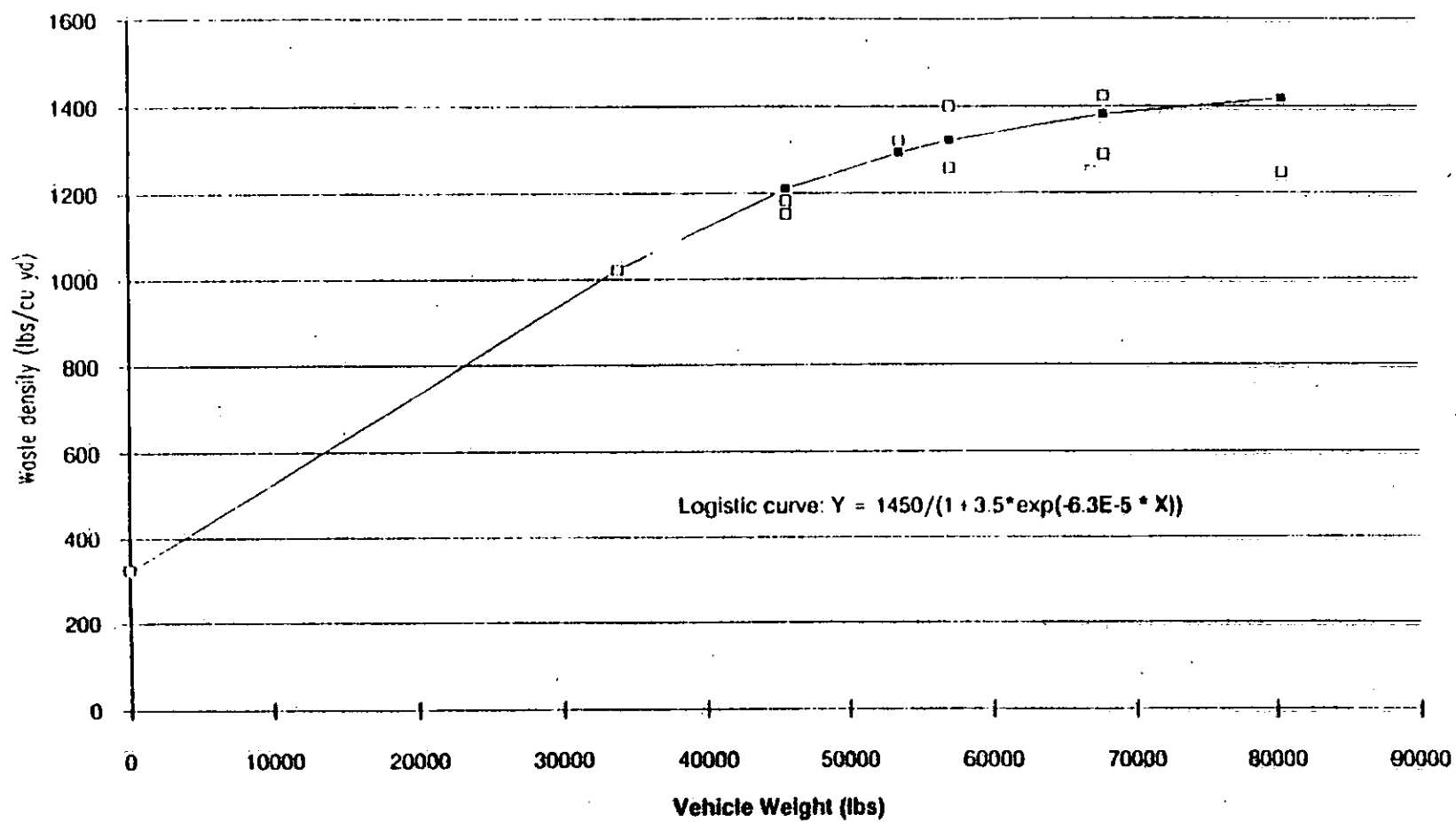


Figure 2.1 Machine Weight vs. In-Place Density,  
Model (Predicted) Data and Field (Observed) Data

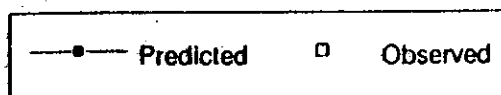


Table 2-1. Machine Weight and Density Data

Machine	Machine		Notes	Reference
	Weight lb	Density lb/cu yd		
Slope: Flat				
Number of Passes: 5 <sup>a</sup>				
Deere JD646-C	33746	1020.8		Collord, 1980a
Cat816B	45477	1151.1	Cat Blades	Collord, 1981
Cat816B	45477	1180.05	Caron Teeth	Collord, 1981
Rexnord 3-70	57000	1255.63		Collord, 1979
Rexnord 3-70	57000	1398.77		Collord, 1979
Cat826C	67670	1287.58		Collord, 1980b
Cat826C	67670	1423.57		Collord, 1980b
BomagK701	80325	1246.77		Collord, 1980b
Cat966	53490	1318		New Milford, Waste Management, Inc.1991

<sup>a</sup> Assumed to be five passes based on analysis of data.

waste on a horizontal surface, i.e., zero slope. The data point at a machine weight of zero represents the uncompacted in-place density of 325 lb/cu. yd, as reported in the literature (Diaz, Savage, Golueke, 1982).

As shown in Figure 2-1, in-place density initially rises rapidly with machine weight; however, the rate of increase tapers off, and around 60,000 lb a plateau is reached. Such saturation effects are often modeled in the scientific literature by a logistic curve of the form

$$(4) \quad Y = a / (1 + be^{-cX})$$

where a, b, and c are positive constants, and e = 2.718... is the base of natural logarithms. As X becomes very large, Y approaches a. At X = 0, Y = a/(1+b). The third parameter, c, affects the curvature of the graph.

A logistic curve fitted to the data presented in Table 2-1 is also presented in Figure 2-1, with a = 1450, b = 3.5, and c = 6.3 x 10<sup>-5</sup>. That is, if Y is in-place density and X is vehicle weight in pounds,

$$(5) \quad Y = 1450 / (1 + 3.5 \times e^{-0.000063 \times X})$$

This suggests that as vehicle weight becomes large, in-place density (assuming five passes and zero slope) approaches 1450 lb/cu yd. Values for other vehicle weights can be calculated from equation (5) with a scientific calculator; equation (5) is also incorporated in the complete model presented below and in the accompanying spreadsheet model.

### Slope

Either compacting waste on a sloping ground surface, or compacting to a sloping finished grade, results in a lower in-place density than compaction on a level surface. Modeling of the effect of slope is a simple matter of physics. On a level surface compaction depends on vehicle weight, as described above. However, on a slope, the effective weight of the compacting vehicle is reduced.

Compaction depends to a large degree on the weight that is exerted in a direction perpendicular to the working face of the landfill. If the surface is sloped at an angle A to the horizontal, then

$$(6) \text{ Effective weight perpendicular to surface} = \cos(A) \times \text{machine weight}$$

where cos(A), the cosine function of trigonometry, is equal to 1 when A=0. Values of cos(A) are shown for a number of angles in Table 2-2.

At large angles, slippage of equipment on the surface will occur. This reduces the force exerted by the equipment on the surface by even more than equation (6) indicates. However, lacking empirical data on equipment slippage, equation (6) is used in the model. The implication of equation (6) is that vehicle weight, as used for example in equation (5), should be replaced by an effective weight = cos(A) x actual weight.

**Table 2-2. Machine Weight Conversion Factors  
For Various Landfill Slopes**

Slope	Conversion Factor (cos (A))
1%	1.00
5%	1.00
10%	1.00
5:1	0.98
4:1	0.97
3:1	0.95
2:1	0.89

### Number of Passes

Based on the literature (Waste Age, 1981), the number of passes made by landfill compacting equipment over waste affects its in-place density in a pronounced manner. Table 2-3 and Figure 2-2 illustrate this impact. As the number of passes increases, in-place density at first increases rapidly.

This relationship again suggests a logistic curve, based on equation (4). A logistic curve fitted to the data in Figure 2-2, with Y = index of in-place density (5-pass density = 100), and X = number of passes yields the equation:

$$(7) \quad Y = 116 / (1 + 3 \times e^{-0.6 \times X})$$

The limit as the number of passes becomes large is 116% of the 5-pass density. As with equation (5), this can be estimated with a calculator. It is also incorporated into the general model presented in Section 3 and is included in the spreadsheet formulation.

Combining equations (5) and (7) and re-defining the set of parameters as:

D = in-place density in lb cu yd

P = number of passes

W = weight of vehicle in pounds

A = slope angle of the surface or finished grade

the equation for in-place density becomes:

$$(8) \quad D = 1680 / [(1 + 3.5 \times e^{-0.000063 \times W \times \cos(A)}) (1 + 3 \times e^{-0.6 \times P})]$$

The numerator, 1680, is the estimated maximum achievable density via vehicle compaction alone. It is the product of 1450, the limit for 5 passes with heavy vehicles according to equation (5), multiplied by 116%, the maximum increase over the 5-pass density achievable with repeated passes according to equation (7).

Equation (8) does not hold in a physical sense in the limit where either W or P is zero, i.e., if there is no vehicle or number of passes is equal to zero. Equation (8) holds for positive values of W and P. In general equation (8) should apply to those situations where the number of passes is in the range of 2 to 9, the weight of the compaction equipment is 30,000 lb to 90,000 lb, and the slope of the working face is in the range of 6:1 to 2:1.

Notice, also, that equation (8) does not allow for variation in the composition or as-delivered density of the waste stream. It was estimated based on published data, assuming average or default values for waste stream composition and density. Two further extensions of the model, allowing its integration with the in-truck model, and allowing for variation in the incoming waste stream composition, are presented in Section 3.

**Table 2-3. Effect of Equipment Passes Over  
Waste on In-Place Density (Flat Slope)**

<b>Number of Passes (p)</b>	<b>Density at Pass (p) D(p) (lb/cy)</b>	<b>Change in Density D(p) - D(p-1) (lb/cy)</b>
0	350	-
1	565	215
2	775	210
3	970	195
4	1125	155
5	1225	100
6	1300	75
7	1350	50
8	1375	25
9	1395	20
10	1405	10

Reference: Waste Age, September 1981, Page 66.

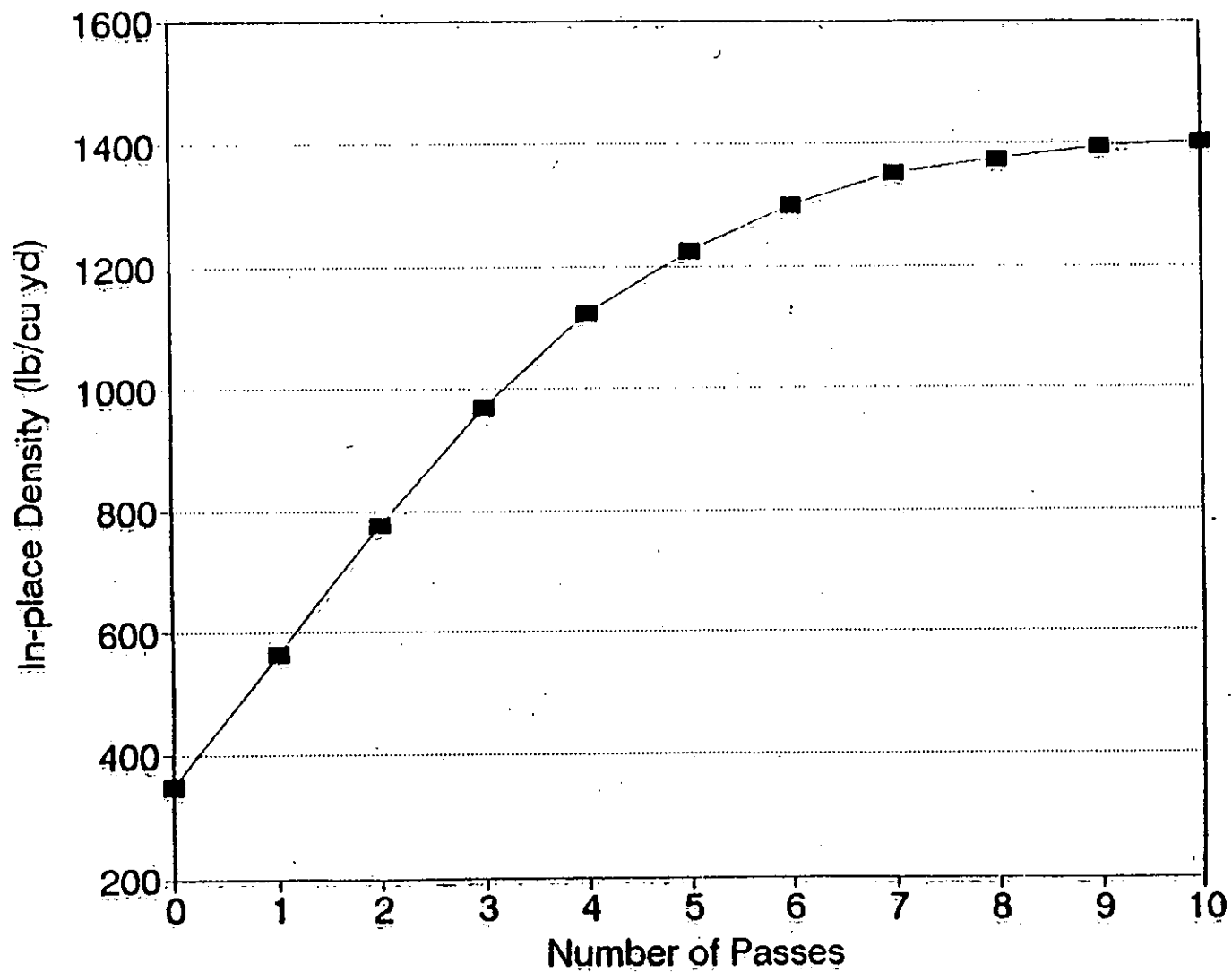


Figure 2-2. Influence of Number of Passes on In-place Density  
(zero slope)

After the in-place density (in lb/cu yd) has been calculated, the user can use the density value to compute the volume of landfill occupied by a given weight of solid waste, i.e., volume (in cu yd) of a specified landfill space occupied = weight of solid waste (tons) divided by average in-place density (in lb/cu yd) multiplied by 2000 lb/ton.

#### **Data Collection and Model Testing**

A telephone survey of California landfills was conducted for the purpose of acquiring in-place compaction data. The landfills which reported on their compaction equipment, together with their responses, are listed in Table 2-4. The 31 reported values for in-place density are reported in Table 2-4. Data were incomplete or inferred from partial information for many of the reporting locations. Eighteen of the data were judged representative for the purpose of checking the validity of the model. As a point of information, the reported in-place densities were almost always rounded off to the nearest 100 lb/cu yd, introducing rounding errors of up to 5%.

For the 18 points, the average reported actual density was 1165 lb/cu yd, while the model represented by equation (8) predicted an average of 1380 lb/cu yd. The average error was 215, or 15%; the standard deviation of the errors was 174. A better fit can be obtained by modifying some of the parameters in equation (8) above. But in light of the uncertainties in the 18 data points, the parameter values shown in equation (8) have been retained as appropriate for use as the default values in the compaction model.

The predicted in-place densities are compared to the reported densities in the results section of Appendix B.

Table 2-4. Summary Data from California Landfill Compaction Survey

LF - County	Compaction Equipment				Slope of Cell	In place density (lb/cu yd)
	Model	Year	Weight	Passes		
Durham Rd - Alameda	D9H dozer	n/a	74,900	5	2.75:1	1350
Durham Rd - Alameda	Cat 826C			5	2.75:1	
Durham Rd - Alameda	I/R 750LF			5	2.75:1	
Altamont - Alameda	D9L dozer	n/a	109,200	5	3.0:1	1500
Altamont - Alameda	Cat 826C			5	3.0:1	
Amador Cty Sanitary - Amador	Cat D8	1968		3		
Rock Creek - Calaveras	Bomag BC60	1990	66,230	5	3.5:1	1200
West Contra Costa- Contra Costa	Cat 826B	1972	66,230	3.5	3.0:1	1000
West Contra Costa- Contra Costa	Cat 826C	1981		3.5	3.0:1	
West Contra Costa- Contra Costa	Cat 825C	1983		3.5	3.0:1	
West Contra Costa- Contra Costa	Intl TD25 doz	1986		3.5	3.0:1	
West Contra Costa- Contra Costa	Kom 155A do	1984		3.5	3.0:1	
West Contra Costa- Contra Costa	Kom D65 P	1984		3.5	3.0:1	
West Contra Costa- Contra Costa	Kom TD 15E	1987		3.5	3.0:1	
Acme - Contra Costa	Rex	1971				1250
Union Mine - El Dorado	Cat 816	1979	39,800	9	slope : "fla	1200
Union Mine - El Dorado	Cat 825	1985		9	flat	
Chateau Fresno - Fresno	Cat 826			4.5	3.0:1	
American Ave - Fresno	Cat 826	1986	66,845	5	3.5:1	1200
Orange Ave - Fresno	Rex 350				flat	
Orange Ave - Fresno	Cat D9				flat	
Chestnut Ave - Fresno	Cat 826			4.5	3.0:1	
China Grade - Kern	Cat 826C	n/a	66,845	3.5	3.0:1	1200
China Grade - Kern	Cat D8K doze	n/a		3.5	3.0:1	
China Grade - Kern	Kom D355 do	n/a		3.5	3.0:1	
China Grade - Kern	Cat 637D scra	n/a		3.5	3.0:1	
Arvin Sanitary - Kern	Cat D9H doze	n/a	74,900	3.5	3.0:1	1200
Arvin Sanitary - Kern	Cat 826B			3.5	3.0:1	
Arvin Sanitary - Kern	Cat 623B scraper			3.5	3.0:1	
Hanford Sanitary - Kings	I/R LS750	1987	79,000	6	3.0:1	1200
Western Regional - Placer	CAT826	n/a	66,845	5	3.0:1	1100
Highgrove Sanitary - Riverside	I/R LF750 300	1989	81,000	2.5	3.0:1	1200
El Sobrante - Riverside	Cat826C	1986	66,845	7	2.0:1	1224
El Sobrante - Riverside	REX390	1990	66,845	7	2 to 1	
Sacramento County - Sacramento	Cat 826	1991	66,845	4	5.0:1	1200
Sacramento County - Sacramento	Cat826	1988		4	5 to 1	
Sacramento County - Sacramento	Cat826	1986		4	5 to 1	
Sacramento City - Sacramento	Cat826	1983	66,845	6	0.13:1	1100
Milliken Sanitary - San Bernardino	Cat 826 w/spikes		66,845	6		1000
Colton Refuse - San Bernardino	Cat826	n/a	66,845	6	3.0:1	1000
Miramar - San Diego	Cat826	1988	66,845	2	3.0:1	1280
Miramar - San Diego	D9Trak Dozer	1988	66,845	2	3.0:1	
North County - San Joaquin	Cat826	1988	66,845	6	3.0:1	1100
Harney Lane - San Joaquin	Cat826	1988	66,845	6	2.0:1	1100
City of Paso Robles - San Luis Obispo	D9 dozer		66,845		2 to 1	
Tajiquas - Santa Barbara	Cat826C	1989	66,845	9	2.5:1	1275
Tajiquas - Santa Barbara	D9H doz w.ca	1990	84,900	9	2.5:1	1275
City of Lompoc - Santa Barbara	Ingersoll	1988	81,000	4.5	3.0:1	1000
Newby Island - Santa Clara	Cat826	1988	66,845	5	3.0:1	1750

Table 2-4. Summary Data from California Landfill Compaction Survey

LF - County	Compaction Equipment				Slope of Cell	In place density (lb/cu yd)
	Model	Year	Weight	Passes		
Buena Vista - Santa Cruz	D9 dozer	1990	74,900	3.5	3.0:1	1050
Buena Vista - Santa Cruz	Cat826C	1990		3.5	3 to 1	
Potrero Hills - Solano	C4 826C	1983	66,845	3.5	3.0:1	1300
Potrero Hills - Solano	C5 826C	1989		3.5	3.0:1	
Central - Sonoma	Cat826	1990	66,845	5	3.0:1	1200
Central - Sonoma	Cat826	1990		5	3.0:1	
Fink Road - Stanislaus	Cat	1980		5	3.0:1	1000
Tuolumne Cty - Tuolumne	Cat816	n/a	39,800	5	3.0:1	1200
Simi Valley - Ventura	Cat 826	1989	66,845	5	3.0:1	1200
U.C. Davis - Yolo	Deere646 w/c	1982	42,230	6	3.0:1	898

### Section 3

#### THE GENERAL MODEL

The variable and physical effects described in the preceding sections may be combined into a single, general, unified model in order to estimate in-truck densities and to subsequently estimate in-place landfill densities.

#### INTEGRATION OF IN-TRUCK AND IN-PLACE DENSITY MODELS: USE OF THE SPREADSHEET VERSION

The spreadsheet submitted with this report combines both the in-truck and in-place compaction models presented previously. The models may be used separately, either with the supplied (default) parameters or with user-specified changes in the parameters.

The models may also be combined into a joint model of compaction throughout the waste collection and disposal process. The user may enter waste composition in the in-truck model, then allow that waste stream to flow through to the in-place model.

Two additional parameters are required for joint, or sequential, use of the models in a single analysis. First, the in-place model requires an estimate of the as-delivered density for a load of waste received at a landfill; this can either be derived as the uncompacted density of the waste stream, or entered separately.

Second, the in-place model requires an estimate of the relative compactability of the particular waste load, relative to the compactability of the California default waste stream. (That is, compactability is an index number  $k$ , defined as  $k = 1.0$  for the California default waste composition, and as  $k = 0.0$  for materials which cannot be compacted.) The user may enter an independent estimate of compactability for a waste load, or the in-truck density model can be used to calculate  $k$ :

$$(9) \quad k = \frac{(\text{truck-compacted density} / \text{curbside density for current waste stream})}{(\text{truck-compacted density} / \text{curbside density for default waste stream})}$$

Then, letting

$S_x$  = as-delivered density

$x$  = subscript for current waste stream

$def$  = subscript for default waste stream

and recalling that the calculation of default waste stream in-place density,  $D_{def}$ , is given by equation (8), the complete model calculates

$$(10) \quad D_x = S_x (D_{def}/S_{def})^k$$

Note that when  $k=0$ ,  $D = S$  -- that is, in-place density equals as-delivered density, since there is no compaction. On the other hand, when  $k=1$ ,  $D_x/S_x = D_{def}/S_{def}$  -- that is, compaction of waste stream  $x$  is exactly proportional to the compaction of the default waste stream.

An example of the printout of the General Model is presented in the examples section of Appendix B.

The unified model is a complex model that combines a number of variables to describe waste compaction in different situations. The model is amenable to user modifications based on site-specific conditions and to new data as they become available.

These observations concerning the behavior of glass containers undergoing compaction in a matrix of other waste types suggest an extension of the first order model to a second order model. For each waste material, define the "zero compaction percentage" as:

$z_i$  = maximum value of  $p_i$  at which no compaction of material  $i$  occurs in mixed waste

Based on observation in the field, a value of  $z_i = .3$  (i.e., 30%) for glass containers, and 0 for most other materials is deemed accurate. The reason is that glass is a brittle material that exhibits a large and very steep discontinuity in the bulk density versus applied load relation at the point where the applied load fragments the glass objects, i.e., the bulk density increases dramatically as the objects break. The only material type of consequence in MSW that exhibits this phenomena is glass.

For a waste type such as glass containers,  $c_i$ , the compacted density of the homogeneous waste type, does not accurately reflect the compacted density of glass in mixed waste. Instead, when  $p_i < z_i$ , the uncompacted density  $d_i$  is the accurate density value (cushioning is complete, and no compaction occurs). When  $p_i > z_i$ , the compacted density increases toward a limit of  $c_i$  when  $p_i = 1$ . For  $z_i < p_i < 1$ , the compacted density is a weighted average of  $d_i$  and  $c_i$ .

To express this relationship, a scaling variable is defined and is used only for those material types that behave like glass under compression, i.e., the variable ranges from 0 at  $p_i = z_i$  to 1 at  $p_i = 1$ .

$$q_i = \begin{cases} 0 & \text{if } p_i < z_i \\ (p_i - z_i) / (1 - z_i) & \text{if } p_i \geq z_i \end{cases}$$

The parameter  $q_i$  designates the fraction of possible compaction of glass (or other materials with  $z_i > 0$ ) which occurs in a given load of mixed waste.

Defining the mixed-compaction density  $m_i$  of waste type  $i$  in a mixed waste batch,

$$(2) \quad m_i = \begin{cases} c_i & \text{if } z_i = 0 \quad (\text{use compacted density except for glass}) \\ (1 - q_i)d_i + q_i c_i & \text{if } z_i > 0 \quad (\text{for glass, use weighted average of compacted, uncompact densities}) \end{cases}$$

Finally, substitution into equation (1) yields,

$$(3) \quad D = 1 / (\sum_i p_i / m_i)$$

Equation (3) differs from (1) only for those wastes for which  $z_i > 0$ . In those cases, the compacted density of material type  $i$ ,  $c_i$ , is replaced by a weighted average of  $c_i$  and the uncompact density  $d_i$ ;  $q_i$ , as defined above, is the fraction of the complete compaction of waste type  $i$ . A high value of  $z_i$ , through its influence on  $q_i$ , implies a high degree of cushioning, and a relatively low degree of compaction, of waste type  $i$  in a mixture of waste types.

## Appendix A

### TEST PLAN

#### MIXED WASTE AS RECEIVED DENSITY STUDY

##### REFUSE COLLECTION VEHICLES

**Purpose:** To determine the as received density of municipal solid waste collected by various types of refuse and self-haul vehicles.

##### **Test Plan: Refuse Collection Vehicles**

In cooperation with Marin Sanitary Service, a variety of refuse collection vehicles will be randomly selected after completing collection runs and weighed on the Marin Resource Recovery scales. The vehicles will be representative of solid waste generated in Marin County and delivered to California landfills. Tare weights for each truck will be determined prior to the test. Using information supplied by each manufacturer, the capacity of each truck type will be noted.

##### **Procedure:**

Five to ten randomly selected collection vehicles of specific manufacturers from the following general waste source categories will be sampled: rear loaders, front and/or side loaders, and roll-off boxes. For example, Marin Sanitary Service owns three types of rear loaders (Heil, Dempster, Garwood). Therefore, Heil, Dempster, and Garwood vehicles will be selected for weight determinations. In cases where there are less than 5 actual vehicles in operation of a particular manufacturer and model, multiple loads for that vehicle type will be weighed.

After the driver has completed his collection run, he will be instructed to weigh the truck before going to the transfer station. For each vehicle selected for weighing, the manufacturer, model number, vehicle design volumetric capacity, tare weight, and waste source (i.e., residential, commercial or industrial) will be noted by CalRecovery personnel.

The driver will also be asked to estimate what volume of the vehicle is occupied by waste (e.g., 70%, 80%, 90%, etc.). The driver will be asked also to define the waste source of the load (i.e., residential, commercial, industrial, or mixed).

Criteria for waste stream determination for this study will be:

- Residential: collection from single family households. A load must contain no less than 90% residential generated waste to be considered residential;

- Commercial: collection from multi-family and commercial businesses. A load must contain no less than 90% commercial generated waste to be considered commercial;
- Industrial: collection from generators generally considered by Marin Sanitary Service to be industrial in nature and/or debris box waste;
- Mixed: loads that do not meet the residential, industrial or commercial definitions.

All of the information will be entered on a data sheet which is attached to this test plan.

## **SELF-HAUL VEHICLES**

In cooperation with the Marin Resource Recovery Facility, a selection of self-haul vehicles will be weighed and the waste type categorized before entering the Resource Recovery Facility. This aspect of the study will produce information about non-compacted self-haul waste.

### **Procedure:**

Using the scale at the Marin Resource Recovery Facility, random weighings of incoming self-haul vehicles will be made. A minimum of twenty residential and twenty commercial vehicles will be weighed. Vehicles will be weighed before entering the facility: the volume of the load will be estimated visually by a trained observer and type of waste will be noted on the data sheet. After dumping the load, the vehicle will be weighed again to obtain the tare weight.

For this study, self-haul waste is classified into one of four categories: yard waste, construction/demolition debris, dirt/rubble, or miscellaneous (e.g., household refuse). For example, if a load is estimated by visual observation to contain a majority of yard waste, it will be designated a yard waste load. The categories are defined as follows:

- Yard waste: loads typically consisting of residential yard clean-up and maintenance debris;
- Construction/demolition: loads resulting from construction, repairs, remodeling, and demolition projects;
- Dirt/rubble: loads consisting of debris-filled dirt and, on occasion, clean dirt for use as landfill cover;
- Miscellaneous: loads which cannot be classified into one of the categories listed above.

## Date \_\_\_\_\_

**Date** \_\_\_\_\_

[illegible]

Date: \_\_\_\_\_

### Type of

Truck

front

**Manufacturer**

## Model

Capacity  
cubic yds

Tare wt.  
lbs.

Incoming  
Weight

## Incomin Capacity

### Waste Stream

Mixed

es.

Comm.

Indust.

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Appendix B

**AN IN-DEPTH EXAMINATION OF HOW THE MODELS WORK:  
TEXT, EXAMPLES, AND TEST RESULTS**

## Appendix B-1

### THE THREE MODELS

In this report, three models were previously presented: two to evaluate the in-truck density of waste, and one to calculate the in-place density of waste at a landfill. The two in-truck density models are named the Simple Model and Model 2. The third model, the In-Place Density Model, works independently from the two in-truck density models but information from Model 2 may be selected for use in the In-Place Density Model. The three models will be explained in detail below.

#### THE SIMPLE MODEL

The Simple Model estimates the weight of incoming waste entering the facility over a given period of time. It does this by taking into account the following information: the truck type and its capacity, percent of capacity utilized, and an average in-truck waste density for each truck type. This model is also capable of modeling self-haul by simply including the self-haul vehicle type and density values in the spreadsheet model. (Observe the difference between the Redwood Sanitary Landfill example and the Rural Landfill example.) The Simple Model is useful when a facility does not have information about the local waste stream; it allows use of California default values for in-truck densities. In the examples, the incoming and tare weights of the trucks are included; one does not need this information to run the model. The advantage of the Simple Model is that it requires very little information to make an estimate of the tonnage entering a facility.

#### MODEL 2

Model 2 estimates in-truck density by combining regional waste composition information and materials density data to calculate the average regional waste density per vehicle. The model works in a two step manner. First, the model utilizes the waste composition information and density data to calculate an average in-truck waste density. Second, the model uses the average in-truck waste density value to estimate the total weight of the waste entering a facility on any given day. To do this, one must know the capacity of the truck or vehicle and the percent of the capacity utilized, but one does not need to know the type of truck or vehicle used. (Please refer to the Redwood Sanitary Landfill example for a detailed example of how the spreadsheet model is set up.) Incoming and tare weights are reported in the example, but are not needed for model application.

#### THE IN-PLACE DENSITY MODEL

The In-Place Density Model has been developed to estimate the amount of space that waste will occupy in a landfill. There is some speculation that, since waste arrives in trucks, it is already partially compacted upon arrival. Thus, one should consider the in-truck density in the calculation of in-place density. There is also a counter-argument that waste arrives at a landfill

in trucks but then fluffs up again after it is dumped at the landfill and manipulated by landfill compaction equipment, and thus the important arrival density is the uncompacted density of the waste. The In-Place Density Model has been designed to allow the user to choose either of these points of view for use in calculation. The model uses input information on the weight of the compaction vehicle used at the landfill, the number of passes the compaction vehicle makes over the waste, and the slope of the fill, to calculate in-place density. (The reader is referred to the example of 18 California landfills.)

## Appendix B-2

### HOW THE SPREADSHEET MODELS WORK

Each of the following three sections examines a specific example for each spreadsheet model. The text discusses how the data is input and how the models calculate the results.

#### EXAMPLE 1: THE SIMPLE MODEL

Imagine a small rural landfill operator who does not have truck scales and does not know the composition of the waste stream in his/her region, or desires a reasonably accurate estimation of incoming tonnage using a simple and easy to use model. Then, the easiest way for this person to determine the number of tons entering the facility in a given time period is to use the Simple Model. To use the Simple Model the following pieces of information are needed:

1. Truck or Vehicle Types Entering the Facility
2. Capacity of Trucks or Vehicles
3. Percent of Capacity Utilized
4. Average Density of Waste in each Truck Type

To obtain the first set of information it is necessary to have someone stationed at the facility entrance recording the type of vehicle entering, its capacity, and percent full, or to set up a system where the drivers would record this information themselves and put it in a common collection box. The driver is often the best source of information as to type of vehicle, capacity, and especially percent full.

Once the data is collected, the next step is to input the data into the Simple Model spreadsheet. The first column allows the user to number the entry, i.e., 1, 2, 3. The second column asks for truck type. In this column it is essential that the proper code is entered for each truck since the model depends on recognizing the truck code in that cell and calculating by the correct in-truck density value. The third column requests that the volumetric capacity of the vehicle be entered in units of cubic yards. The fourth column requires the user to input the data describing how full the truck is as it enters the facility, i.e., for a 20-cu.yd vehicle filled to 15 cu yd, 75% is entered in this column. After the user completes all the data input, the model calculates the estimated weight in the truck in the fifth and final column. The equation the model uses in doing this is as follows:

$$\text{estimated in-truck weight} = \text{truck density value} \times \text{truck capacity} \times \text{percent full}$$

Looking specifically at the Rural Landfill example, the following text examines four data entries and provides a step-by-step process for using the Simple Model. These data entry lines have been highlighted on the spreadsheet to make it easier to follow the example.

First, in the Rural Example, it is assumed that there are four types of vehicles entering the facility: mini-pickups, full-sized pickups, rear loaders, and front loaders. The legend to the model provides the average in-truck density values which are used to estimate the waste entering the

facility. If one desires to change these values based on information which is specifically relevant to a particular landfill, one enters the new value in the value column of the legend box next to the appropriate truck code.

In the first example, enter the entry number (1), the truck type (i.e., RL), the truck capacity (20 cu yd), and the percent of the capacity utilized by the incoming truck (i.e., 100%). The model computes the weight of the waste in the vehicle. The following four equations describe the calculations for entries 1, 14, 26, and 39.

$$1. \text{RL}(525 \text{ lb/cu yd}) \times (20 \text{ cu yd}) \times (100\%) = 10,500 \text{ lb}$$

$$14. \text{FL}(480 \text{ lb/cu yd}) \times (30 \text{ cu yd}) \times (75\%) = 10,800 \text{ lb}$$

$$26. \text{FP}(316 \text{ lb/cu yd}) \times (2.5 \text{ cu yd}) \times (100\%) = 790 \text{ lb}$$

$$39. \text{MP}(294 \text{ lb/cu yd}) \times (1.25 \text{ cu yd}) \times (100\%) = 367.5 \text{ lb}$$

#### EXAMPLE 2: MODEL 2

Imagine a large urban landfill operator who does not have truck scales, but does know the composition of the waste stream in his/her region. Then, the easiest way to determine the number of tons entering the facility in a given time period is to use Model 2. To use Model 2, one needs the following pieces of information:

1. Waste Composition of the Jurisdiction being Served
2. Capacity of Trucks or Vehicles Entering Facility
3. Respective Percent of Capacity Utilized

To obtain information on the jurisdiction's waste composition, county and city solid waste departments may be contacted. As a requirement of AB 939, all cities and counties in California are to determine their waste compositions. To collect the second set of information, it is necessary to have someone stationed at the facility entrance recording the entering vehicle's capacity and percent full, or again to set up a system where the drivers would record this information themselves upon entering.

After the data is collected, the next step is to input the data into the Model 2 spreadsheets. The first spreadsheet requires the user to input the jurisdiction's waste composition. Since the example is from the Redwood Sanitary Landfill in Marin County, the waste composition for Marin County from a 1991 study was used as input data. Note that the only place the user inputs information on this sheet is in the second column titled "Waste Stream Percent by Weight" (denoted by  $p$  in the formulas). The third column lists the uncompacted waste density values (denoted by  $d$  in the formulas) which the model uses to calculate the average in-truck density. The fourth column lists the compacted waste density values (denoted by  $c$  in the formulas). The fifth column, "Zero Compaction Percentage" (denoted by  $z$  in the formulas), represents the critical percentage for each waste type below which this material will not compact in a truck. Based on examination of the mixed waste studies conducted by the project team, it was determined that this percentage is only relevant for glass. Thus all other materials are assumed to compact in a truck regardless of their contribution to the total load. Glass is assumed to

compact in a truck only if it comprises 30% or more by weight of the total load in the truck, otherwise the uncompact glass density is used in the model calculations.

In order to understand how Model 2 calculates the average in-truck density for Marin County, let us examine the rows describing corrugated containers (at the top of the spreadsheet), and recyclable glass (in the middle of the spreadsheet).

#### Corrugated Containers

$p := 5.90\%$

$d := 133 \text{ lb/cu.yd}$

$c := 360 \text{ lb/cu.yd}$

$z := 0$

For this material  $q$  (the waste stream composition percent expressed as a decimal)  $= .06$ ;  $m$  (the appropriate density to be used for the calculation, uncompact or compact)  $= 360 \text{ (lb/cu.yd)}$ . In this case we use the compact density because the  $z$  value is 0. Thus regardless of the amount of this material in the truck, the waste will compact normally.

$p \times m := (.06) \times (360 \text{ lb/cu.yd}) = 21 \text{ lb/cu.yd}$

#### Recyclable Glass

$p := 2.9\%$

$d := 455 \text{ lb/cu.yd}$

$c := 1258 \text{ lb/cu.yd}$

$z := 130\%$  (Since recyclable glass only comprises 2.9% of the waste composition, much below the critical zero compaction percentage of 30%, the correct density to use for the calculation is the uncompact density.)

$q := .03$

$m := 455 \text{ lb/cu.yd}$  (as opposed to 1258 (lb/cu.yd) which would be used if  $p > 30\%$ )

$p \times m := (.03) \times (455 \text{ lb/cu.yd}) = 1.3 \text{ lb/cu.yd}$

The second spreadsheet of Model 2 incorporates the average in-truck density calculated in the first spreadsheet to evaluate the total weight of waste entering the facility over a given period of time. The next example examines data for the Redwood Sanitary Landfill on December 12, 1991.

In the first column, the user inputs the entry number, e.g., 1. In the second column, the user inputs the capacity in cubic yards of the entering vehicle. The third column requires the user to input the data describing how full the truck is as it enters the facility, i.e., for a 20-cu.yd. vehicle

filled to 18 cu yd, 90% is entered. After the user has completed all the data input, the model calculates the estimated weight in the truck in the fourth and final column. The equation the model uses is as follows:

$$\text{estimated in-truck weight} = (\text{average in-truck density value [calculated in the previous spreadsheet]}) \times (\text{truck capacity}) \times (\text{percent full})$$

Looking specifically at the Redwood Sanitary Landfill example, let us follow step by step the process of using the second spreadsheet of Model 2 by examining the first data entry. The data input boxes described have been highlighted on the spreadsheet to make following the example easier.

First, the average in-truck density for Marin County in the first spreadsheet was calculated; this value (724 lb/cu yd) appears in the second spreadsheet of Model 2 in a box at the top of the spreadsheet. If the spreadsheets are not linked automatically or if the average in-truck density of your waste stream is known, the proper value may be typed in this box.

In the first example, the entry number is 1, the truck capacity is 20 cu yd, and the percent of the capacity utilized by the incoming truck is 90%. The model computes the weight of the waste in the vehicle using the following equation:

$$1. (724 \text{ lb/cu yd}) \times (20 \text{ cu yd}) \times (90\%) = 13,032 \text{ lb}$$

To determine the total number of tons entering the facility on this day, all of the data in columns 1, 2, and 3 were entered and totalled the fourth column, for a total throughput of 652,779 tons.

### EXAMPLE 3: IN-PLACE DENSITY MODEL

The In-Place Density Model is based on a more sophisticated set of equations than those previously discussed, but it is still easy to use. The simplest way to explain how this model functions is to look at an example and to explain each equation as it is utilized in the model.

This model requires the user to input three pieces of data:

1. The Weight of the Compacting Vehicle
2. The Number of Passes the Vehicle Will Make Over the Waste
3. The Slope Angle of the Surface or Finished Grade of the Fill

The In-Place Density Model provides certain default data if data is not readily available.

To implement the model, the user inputs an entry number in the first row, in our example it is the XYZ Landfill. In the second row, the user is requested to input the weight of the compacting vehicle in pounds. If the type of vehicle used is known, but not the weight of the vehicle, please refer to Section 2, Table 2-1 of this report for a list of machine weights. In the third row, the user inputs the number of passes the vehicle will make over the waste. In the fourth and fifth rows the user inputs the slope of the finished grade of the fill either as a ratio or as an angle.

The following calculations pertain to the fictitious example of the XYZ landfill:

entry number = "XYZ Landfill"

vehicle weight = 166845 lb

number of passes = 7

slope angle of finished grade = 3:1 ratio

The model makes the following calculations in determining the in-place density of the waste, employing five estimated constants in doing so:

K1 = 1635

K2 = 3.4

K3 = 4.2E-05

K4 = .55

K5 = .25

The model relationship is characterized by the following equation:

$$\frac{K1}{(1 + K2 \times e^{-K3 \times \cos(\text{slope angle}) \times \text{vehicle weight}}) \times (1 + K4 \times e^{-K5 \times \text{number passes}})}$$

First the model calculates the angle in radians. If the user has entered the slope as a ratio the model uses this formula:

angle in radians = arctangent of 1/slope ratio

In our example, angle in radians = arctangent of 1/3 = 0.32 radians.

If the user has entered the slope in degrees, the model transforms the angle from degrees to radians:

$$\text{angle in radians} = \frac{\text{angle in degrees} \times \text{Pi}}{180}$$

Next the model takes the cosine of the angle as it is expressed in radians:

cos = cos (angle in radians)

In our example, cos = cos (0.32) = 0.95

Then the model calculates the two exponentials used in the characterization equation above:

first exponential =  $1 + K2 \times e^{-K3 \times \cos(\text{slope angle}) \times \text{vehicle weight}}$

In our example, first exponential =  $1 + 3.4 \times e^{-4.2E-05 \times .95 \times 66,875} = 1.24$

second exponential =  $1 + K4 \times e^{-K5 \times \text{number passes}}$

In our example, second exponential =  $1 + .55 \times e^{-.25 \times 7} = 1.10$

The final equation combines all of this information to calculate the in-place density:

$$\text{in-place density} = \frac{K1}{\text{first exponential} \times \text{second exponential}}$$

In our example, in-place density =  $1635 / (1.24 \times 1.10) = 1206 \text{ lb/cu yd}$

(Note: Due to rounding errors, the calculation shown in the text appears to yield 1199; the model, retaining more significant figures, calculates the result of 1206)

#### **EXAMPLE 4: THE GENERAL MODEL (COMBINED MODEL 2 AND IN-PLACE DENSITY MODEL)**

Both Model 2 and the In-Place Density Model have been demonstrated in detail. The combination of the two models is straightforward. There is an example utilizing waste from ABC County going to landfill XYZ in the tables of the examples. The tables have explanatory text to assist in user comprehension of the model.

### Appendix B-3

#### TESTING THE MODELS

Information collected at two landfills was utilized in testing the Simple Model and Model 2. Data from over a two-day period were collected, respectively, from Redwood Sanitary Landfill and Bee Canyon Landfill. The actual weight of the waste for each vehicle was calculated in the spreadsheet by subtracting the tare weight of the truck from the incoming weight of the truck:

$$\text{actual weight} = \text{incoming weight} - \text{tare weight}$$

To test the accuracy of the Simple Model, the truck type, the capacity, and percent full were entered into the model spreadsheet. Then based on the values determined for each truck type the model calculates the estimated weight of the materials in the truck:

$$\text{weight of waste in truck} = (\text{truck type density}) \times (\text{capacity}) \times (\text{percent full})$$

To test the accuracy of the Model 2, the jurisdiction's average waste density was first calculated based on that region's waste composition. Then this information was used to estimate the weight of the incoming waste over a given period of time. In the first spreadsheet of the model, the waste composition was entered, and in the second spreadsheet, the truck's capacity and percent full were entered. Based on the average density value determine in the first spreadsheet of the model, the model calculated the estimated weight of the materials in the truck:

$$\text{weight of waste in truck} = (\text{average in-truck density}) \times (\text{capacity}) \times (\text{percent full})$$

In order to test the In-Place Density Model, California landfills were surveyed to gather data on compactor types, number of passes made by compactors, slope angles, and estimated in-place densities. Eighteen observations were obtained, as shown in the in-place density table. Unfortunately, most of the observations were estimates made by landfill operators, and were not based on actual measurements of in-place density. Many of the reported densities were rounded off to the nearest 100 lb/cu yd, introducing rounding errors of up to  $\pm 5\%$ .

The In-Place Density Model was used to estimate densities for these 18 sites; the results are shown in the In-Place Density Model table and the accompanying graph. While there is a qualitative correspondence between model estimates and landfill operator estimates, precise quantitative comparison does not appear justified, in light of the inherent imprecision in the field data available to date.

#### LIMITATIONS OF THE MODELS

There are several limitations to the in-truck density models shown in this report. First, composition of the waste in the individual trucks was not known; the wide range of calculated densities clearly implies substantial variation in the range of materials being delivered. Some

trucks reported densities of under 200 lb/cu yd. while others reported close to or over 1000 lb/cu yd.

Second, the calculations necessarily rely on the landfill's estimates of the percent of full capacity in each delivered truckload. These percentages were almost always rounded off to the nearest 5% or 10%; moreover, they likely involve a substantial component of qualitative judgment. Most of the trucks for which the highest densities calculated were reported 75% or less filled, while most other trucks reported 80% or more filled. If the "high-density" trucks were actually cases of accidental under-reporting of percent full, then the density differences may be artifacts of reporting, rather than actual observations.

How accurate are the in-truck models likely to be in a specific field application? Errors can enter in any stage of data collection:

- Truck capacities might be reported incorrectly; this seems unlikely, and may be ignored.
- Percent full might be estimated incorrectly at the landfill; this is a potentially serious problem in any application.
- Waste-stream related errors may enter: The average compacted density for all solid waste (in the Simple Model) or for a particular waste type (in Model 2) might be incorrect; and the waste composition for a particular truckload (explicitly used in Model 2, implicitly used to derive the average density in the Simple Model) might differ from the average used in the model.

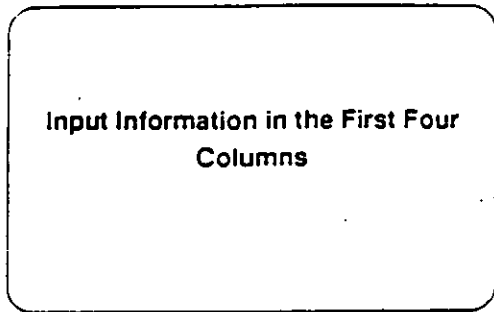
There is no simple way to determine "how much" data is needed for accurate estimation. The more important question is whether errors are random or systematic; in the latter case, no amount of data will help. If errors in estimating percent full, or errors related to waste stream composition and compaction, are randomly distributed, then more observations will lead to more accurate estimates, on average. However, if systematic errors are being made in either estimates of truck loading or in estimates of waste stream composition, then additional observations will only reinforce these errors. A key aspect for accurate model use is that field testing is required to acquire data under local conditions and to confirm that unbiased estimates are, on average, being made.

### **Examples of the Three Models:**

- 1 Simple Model - Rural Example**
- 2 Model 2 - Redwood Sanitary Landfill Example**
- 3 In-Place Model - XYZ Landfill Example**
- 4 Combination In-Truck and In-Place Density Model (The General Model) -  
ABC Waste Source and XYZ Landfill Compaction Data**

# IN-TRUCK DENSITY MODEL: Simple Model

A Rural County: 50% Self Haul, 25% Rear Loaders, 25% Front Loaders(Commercial)



Legend		Value
Truck Type	Code	(lb/cu yd)
Mini Pick-up	MP	294
Full Pick -up	FP	316
Rear Loader	RL	525
Front Loader	FL	480
Compacting Roll-Off	CRO	680
Open Top Roll-Off	OTR	400

Simple  
Model  
Estimated  
weight  
(lb)

Entry #	Truck Type	Capacity (cu yd)	Full	Simple Model Estimated weight (lb)
1	RL	20	100%	10,500
2	RL	20	75%	7,875
3	RL	25	60%	7,875
4	RL	18	75%	7,088
5	RL	16	100%	8,400
6	RL	15	80%	6,300
7	RL	18	100%	9,450
8	RL	10	100%	5,250
9	RL	18	80%	7,560
10	RL	20	80%	8,400
11	RL	15	100%	7,875
12	RL	20	100%	10,500
13	RL	25	80%	10,500
14	FL	30	75%	10,800
15	FL	30	95%	13,680
16	FL	35	50%	8,400
17	FL	35	60%	10,080
18	FL	39	80%	14,976
19	FL	39	100%	18,720
20	FL	39	25%	4,680
21	FL	40	100%	19,200
22	FL	39	100%	18,720
23	FL	35	100%	16,800
24	FL	2.5	90%	1,080
25	FL	40	90%	17,280
26	FP	2.5	100%	790
27	FP	2	75%	474

Entry #	Truck Type	Capacity (cu yd)	% Full	Simple Model Estimated weight (lb)
28	FP	2.5	60%	474
29	FP	2.5	80%	632
30	FP	2	62%	392
31	FP	2	50%	316
32	FP	2	100%	632
33	FP	2.5	100%	790
34	FP	1.75	100%	553
35	FP	2.5	20%	158
36	FP	2	75%	474
37	FP	2	100%	632
38	FP	2	100%	632
39	MP	1.25	100%	368
40	MP	1.5	66%	291
41	MP	1.25	80%	294
42	MP	1.5	20%	188
43	MP	1.5	100%	441
44	MP	1.5	100%	441
45	MP	2.5	40%	294
46	MP	1.75	86%	442
47	MP	1.5	100%	441
48	MP	1.5	100%	441
49	MP	1.25	100%	368
50	MP	1.5	100%	441

Daily Total Weights

273,287

Conversion Factor Study: In-Vehicle and In-Place Waste Densities, Tables 1-16 and 1-18.

Data for this example was drawn from three sources: Redwood Sanitary Landfill, Bee Canyon Landfill, and self-haul data from the Marin County Transfer Station.

## IN-TRUCK DENSITY MODEL 2

Marin County

Estimated density (lb/cu yd): **724**

The User Inputs the Jurisdiction's Waste Composition

Material Type	Waste stream Percent by weight p	Density uncompacted (lb/cu yd) d	Density compacted (lb/cu yd) c	Zero Compaction Percentage z	Intermediate calculations q m p*m		
<b>Paper:</b>							
Corrugated Containers	5.90%	33	360		0.06	359.75	21
Mixed Paper	4.40%	484	613		0.04	612.50	27
Newspaper	1.30%	323	552		0.01	551.50	7
High Grade Ledger	9.40%	364	644		0.09	644.00	61
Other Paper	9.70%	570	635		0.10	635.00	62
<b>Plastics:</b>							
HDPE	0.30%	35	264		0.00	263.75	1
PET	0.20%	39	182		0.00	182.00	0
Film Plastics	4.00%	23	226		0.04	226.00	9
Other Plastics	4.00%	50	372		0.04	371.62	15
<b>Glass:</b>							
Recyclable	2.90%	455	1258	30%		455.38	13
Non-recyclable	0.20%	566	1258	30%		566.00	1
<b>Metals:</b>							
Aluminum Cans	0.30%	91	399		0.00	399.00	1
Ferrous	2.50%	141	501		0.03	501.00	13
Non-Ferrous	0.60%	1248	1248		0.01	1248.32	7
White Goods		255	255			255.40	
<b>Organics:</b>							
Yardwaste	17.00%	292	584		0.17	584.20	99
Other Bio-organic	11.60%	1013	1080		0.12	1080.00	125
Other Nonbio-organic	6.15%	540	648		0.06	648.00	40
Textiles	1.20%	247	540		0.01	540.00	6
Leather	1.20%	380	759		0.01	759.30	9
Woodwaste	6.80%	333	333		0.07	332.65	23
<b>Other Waste:</b>							
Inert Solids	7.80%	1975	1975		0.08	1974.85	154
HHW	0.40%	1523	1523		0.00	1522.70	6
<b>Special Wastes:</b>							
Sewage Sludge		1294	1294			1293.75	
Ash	1.70%	1350	1350		0.02	1350.00	23
Auto Shredder Waste		800	800			800.00	
Dewatered Sludge		1615	1615			1614.60	
Tannery Sludge		NA					
Drilling Mud		NA					
Mine Tailings		NA					
<b>TOTAL</b>	<b>99.55%</b>						
			<b>TOTAL COMPACTED DENSITY 724</b>				

The Model Calculates the In-Truck  
Density of the Waste Stream

Source: Marin County Solid Waste Management Plan, Beck &amp; Assoc. Table 2.4-8/91

# V-TRUCK DENSITY MODEL 2: Redwood Landfill, Marin County

: December 12, 1991

Estimated In-Truck Density:

724

Entry #	Capacity (cu yd)	% Full	Model 2
			Estimated weight (lb)
1	20	90%	13,029
2	15	80%	8,686
3	15	90%	9,772
4	30	90%	19,543
5	18	100%	13,029
6	25	80%	14,476
7	15	80%	8,686
8	18	100%	13,029
9	20	100%	14,476
10	25	70%	12,667
11	18	100%	13,029
12	18	90%	11,726
13	20	90%	13,029
14	20	75%	10,857
15	25	90%	16,286
16	20	80%	11,581
17	20	90%	13,029
18	18	90%	11,726
19	20	75%	10,857
20	20	100%	14,476
21	25	80%	14,476
22	20	80%	11,581
23	18	75%	9,772
24	30	100%	21,715
25	20	100%	14,476
26	20	80%	11,581
27	18	100%	13,029
28	20	100%	14,476
29	20	100%	14,476
30	18	100%	13,029
31	25	80%	14,476
32	25	90%	16,286
33	18	100%	13,029
34	25	90%	16,286
35	20	75%	10,857
36	20	75%	10,857

The User Inputs  
Entry #  
Vehicle Capacity  
and Percent Full

The Model Calculates  
the Estimated Weight  
of the Waste in the  
Vehicle

IN-TRUCK DENSITY MODEL 2: Redwood Landfill, Marin County

December 12, 1991

Estimated In-Truck Density:

724

Entry #	Capacity (cu yd)	% Full	Model 2 Estimated weight	
			(lb)	
37	25	80%	14,476	
38	20	100%	14,476	
39	25	80%	14,476	
40	30	80%	17,372	
41	25	80%	14,476	
42	20	80%	11,581	
43	20	75%	10,857	
44	30	90%	19,543	
45	15	75%	8,143	
46	18	60%	7,817	
47	25	60%	10,857	
48	18	80%	10,423	
49	20	90%	13,029	
50	20	75%	10,857	
Daily Total Weights			652,779	

**RUCK DENSITY MODEL**  
**California default values**

Material Type	Density compacted (lb/cy)	Notes
<b>Paper:</b>		
Corrugated Containers	359.75	Field test result, E. Harlem, NYC, 11-14-91
Mixed Paper	612.50	Field test result, E. Harlem, NYC, 11-14-91
Newspaper	551.50	Field test result, E. Harlem, NYC, 11-14-91
High Grade Ledger	581.60	Assume compaction is 1.6 to 1 (slightly less than newspaper)
Other Paper	627.44	Assume compaction is 1.1 to 1 (slightly less than mixed paper)
<b>Plastics:</b>		
HDPE	263.75	Field test, E. Harlem, NYC, 11-12-91 & 11-13-91, average of two results
PET	182.00	Field test result, E. Harlem, NYC, 11-12-91
Film Plastics	226.00	Assume 10:1 compaction ratio
Other Plastics	371.62	Field obs of polypropylene, coiled, Wakefield, MA
<b>Glass:</b>		
Recyclable	1258.00	Field test result, E. Harlem, NYC, 11-14-91
Non-recyclable	1415.00	Field Test result, North Andover, MA
<b>Metals:</b>		
Aluminum Cans	399.00	Field Studies, California, Baled Aluminum
Ferrous	501.00	Field test, E. Harlem
Non-Ferrous	1248.32	Assume non-compactible
White Goods	255.40	Assume non-compactible
<b>Organics:</b>		
Yardwaste	584.20	Assume 2:1
Other Bio-organic	2026.66	Assume 2:1
Other Nonbio-organic	648.00	Assume 1:2:1 (between mixed paper and non-recycl paper)
Textiles	540.00	Garment District, Boston, low-grade compactor, personal comm.
Leather	759.30	Assume 2:1, slightly less than textiles
Woodwaste	332.65	Assume non-compactible
<b>Other Waste:</b>		
Inert Solids	1974.85	Assume non-compactible
HHW	1522.70	Assume non-compactible
<b>Special Wastes:</b>		
Sewage Sludge	1293.75	Assume non-compactible
Ash	1350.00	Assume non-compactible
Auto Shredder Waste	800.00	Assume non-compactible
Dewatered Sludge	1614.60	Assume non-compactible

**IN-TRUCK DENSITY MODEL**  
California default values

Material Type	Waste stream % by wt.	Density uncompacted (lb/cy)
<b>Paper:</b>		
1. Corrugated Containers	8.00%	33.35
2. Mixed Paper	6.00%	484.00
3. Newspaper	9.00%	322.80
4. High Grade Ledger	1.00%	363.50
5. Other Paper	12.00%	570.40
<b>Plastics:</b>		
6. HDPE	1.00%	34.60
7. PET	0.00%	38.90
8. Film Plastics	2.00%	22.60
9. Other Plastics	3.00%	49.80
<b>Glass:</b>		
10. Recyclable	6.00%	455.38
11. Non-recyclable	1.00%	566.00
<b>Metals:</b>		
12. Aluminum Cans	4.00%	91.40
13. Ferrous	1.00%	141.38
14. Non-Ferrous	1.00%	1248.32
15. White goods	1.00%	255.40
<b>Organics:</b>		
16. Yardwaste	19.00%	292.10
17. Other Bio-organic	8.00%	1013.33
18. Other Nonbio-organic	2.00%	540.00
19. Textiles	2.00%	247.00
20. Leather	1.00%	379.65
21. Woodwaste	3.00%	332.54
<b>Other Waste:</b>		
22. Inert Solids	7.00%	1974.85
23. HHW	1.00%	1522.70
<b>Special Wastes:</b>		
24. Sewage Sludge		1293.75
25. Ash	0.33%	1350.00
26. Auto Shredder Waste	0.33%	800.00
27. Dewatered Sludge	0.33%	1614.60

**IN-TRUCK DENSITY MODEL**  
**California Default Values**

**Notes<sup>a)</sup>**

1. Table 5, Task 2 Report<sup>b)</sup>, averaged flattened (50.1) and whole (16.6)
2. Field test at Wellsley, MA Recycling drop-off facility
3. Table 5, Task 2 Report, without glossy inserts
4. Table 5, Task 2 Report, without CPO
5. Table 5, glossy paper
6. Table 5, Task 2 Report, average of both milk/water (22.1) and mixed color (47.1)
7. Table 5, Task 2 Report, average to PET/mixed (43.3) and PET/CRV (34.6)
8. Table 5, film plastic/mixed
9. Table 5, other plastic #3-7
10. Table 5, average of glass/clear CRV (466.5), glass/clear non CRV (437.8), glass/green (456.7), glass/mix brown (439.6), and glass/mix clear (476.3)
11. Assume 2.5:1 compaction ratio
12. Table 5
13. Field (East Harlem)
14. Field (FS) and Literature Studies (LS), average of LS for lead scrap (1603.84) and copper (1070.57). The figure for copper is an average of LS for copper scrap (1093.52) and FS for copper fittings (1047.62).
15. Table 5, Task 2 Report, average of dishwashers (234), dryers (224), refrigerators/freezers (198), washers (321), and stoves/ovens (300)
16. Table 5, Task 2 Report, average of yardwaste items, exc. items prefixed by "compost", incl.: leaves/dry (343.7) grass/fresh (280.2), prunings/dry <4" (36.9), prunings/green <4" (46.7), large limbs and stumps >4" (1080), garden debris (182.8) and pine needles (74.4)
17. Field test, average of cantaloupes (1000), mixed vegetables (1131), and mixed fruit (909), Star Market, Cambridge, MA
18. Table 5, diapers
19. Field test and Table 5 (FS), average of shoes (224), winter coats (241), jeans (285), T-shirts (260), mixed, some dresses, shirts (225). From Table 5 (FS) carpet and padding (84.4)
20. Field test, average of six different semi-compacted figures collected at Columbia Tanning, Brockton, MA, and Berman Leathercraft, Boston, MA (243, 303, 470, 383, 61, 363.42, 524.85)
21. Table 5, Task 2 Report, average of pallets (210), sawdust (375) wood scrap <2' (329.5), and particle board (425.1). All were FS.
22. Field test and Table 5, Task 2 Report, incl. rock 2" - 12" (2570.96), rock/red lava 5/16" (1325.9), concrete/<8"scrap (1855.2), brick/red-broken <8" (1614.1), ceramic tile 6"x6" (1213.9), sand (2441.3), average of 2 soils (2392, 2385.5)
23. 32% latex paint (1836); 23% enamel paint(1653); 20% oil (1524.94); 25% other (1000 (midpoint of range of other))
24. Table 5, 14.7% solids
25. Table 5, 50% water, trucked
26. Table 5, shredder fluff
27. Table 5, 38% solids

a) All amounts are lb/cu yd unless otherwise noted.

b) Conversion Factors For Individual Material Types, Final Report, Cal Recovery Inc., December, 1991.

## IN-PLACE DENSITY MODEL

Entry Number

### INPUTS:

Vehicle weight (lbs)

Number of passes

Slope angle of surface or finished grade

enter either as ratio X:1 == >

or in degrees == >

### CALCULATIONS:

angle (radians)

cosine

first exponential

second exponential

in-place density

XYZ Landfill

66,845

7

3

0.32

0.95

1.24

1.10

1206

The User Inputs:

Facility Name or Reference  
Weight of Compaction Vehicle  
and Slope of Fill,  
either in a ratio form or as an angle

The Model calculates:  
The Estimated In-Place Density

### ESTIMATED CONSTANTS

K1	. 1635
?	3.40
K3	4.20E-05
K4	0.55
K5	0.25

### Waste stream compaction model:

Estimates: a) compaction of a waste stream in a packer truck  
b) compaction in a landfill

Truck compaction based on measured loose and compacted densities, and on the observation that glass does not compact if it accounts for less than a critical ("zero compaction") percentage of the waste stream.

Landfill compaction based on weight of compacting vehicle, number of passes, surface slope angle, and on loose density and relative compactibility of waste stream as received.

### A: IN-TRUCK COMPACTION MODEL

User enters percentage composition of waste stream, and location, date, and description if desired. Percentage composition must sum to 100%; check calculated percentage below. Results may be used alone, and/or as inputs feeding automatically into the in-place compaction model presented below.

Location:

Date:

Description:

User entries:

XYZ Landfill

3/1/92

Waste Incoming from ABC County

Results:

Sum of waste stream %

Loose density

Compacted density

100.00%

521.82

767.11

**In-Truck Model 2 and In-Place Density Model Combined Example : THE GENERAL MODEL**  
**Waste Composition for ABC County**

Material Type	Waste stream compos.	Density uncompacted (lb/cu yd)	Density compacted (lb/cu yd)	Zero Comp. %	Intermediate calculations			
	p	d	c	z	q	m	p*m	p*d
<b>Paper:</b>								
Corrugated Containers	8.00%	33.35	359.75	0.00%	0.08	359.75	28.78	2.67
Mixed Paper	6.00%	484.00	612.50	0.00%	0.06	612.50	36.75	29.04
Newspaper	9.00%	322.80	551.50	0.00%	0.09	551.50	49.64	29.05
High Grade Ledger	1.00%	363.50	581.60	0.00%	0.01	581.60	5.82	3.64
Other Paper	12.00%	570.40	627.44	0.00%	0.12	627.44	75.29	68.45
<b>Plastics:</b>								
HDPE	1.00%	34.60	263.75	0.00%	0.01	263.75	2.64	0.35
PET	0.00%	38.90	182.00	0.00%	0.00	182.00	0.00	0.00
Film Plastics	2.00%	22.60	226.00	0.00%	0.02	226.00	4.52	0.45
Other Plastics	3.00%	49.80	371.62	0.00%	0.03	371.62	11.15	1.49
<b>Glass:</b>								
Recyclable	6.00%	455.38	1258.00	30.00%	0.00	455.38	27.32	27.32
Non-recyclable	1.00%	566.00	1415.00	30.00%	0.00	566.00	5.66	5.66
<b>Metals:</b>								
Aluminum Cans	1.00%	91.40	399.00	0.00%	0.01	399.00	3.99	0.91
Ferrous	4.00%	141.38	501.00	0.00%	0.04	501.00	20.04	5.66
Non-Ferrous	1.00%	1248.32	1248.32	0.00%	0.01	1248.32	12.48	12.48
White Goods	1.00%	255.40	255.40	0.00%	0.01	255.40	2.55	2.55
<b>Organics:</b>								
Yardwaste	19.00%	292.10	584.20	0.00%	0.19	584.20	111.00	55.50
Other Bio-organic	8.00%	1013.33	2026.66	0.00%	0.08	2026.66	162.13	81.07
Other Nonbio-organic	2.00%	540.00	648.00	0.00%	0.02	648.00	12.96	10.80
Textiles	2.00%	247.00	540.00	0.00%	0.02	540.00	10.80	4.94
Leather	1.00%	379.65	759.30	0.00%	0.01	759.30	7.59	3.80
Woodwaste	3.00%	332.65	332.65	0.00%	0.03	332.65	9.98	9.98
<b>Other Waste:</b>								
Inert Solids	7.00%	1974.85	1974.85	0.00%	0.07	1974.85	138.24	138.24
HHW	1.00%	1522.70	1522.70	0.00%	0.01	1522.70	15.23	15.23
<b>Special Wastes:</b>								
Sewage Sludge		1293.75	1293.75	0.00%	0.00	1293.75	0.00	0.00
Ash	0.33%	1350.00	1350.00	0.00%	0.00	1350.00	4.50	4.50
Auto Shredder Waste	0.33%	800.00	800.00	0.00%	0.00	800.00	2.67	2.67
Dewatered Sludge	0.33%	1614.60	1614.60	0.00%	0.00	1614.60	5.38	5.38
Tannery Sludge		not available						
Drilling Mud		not available						
Mine Tailings		not available						
<b>TOTAL</b>	<b>100.00%</b>						<b>767.11</b>	<b>521.82</b>

## B: LANDFILL COMPACTION MODEL

We seek to estimate the in-place density  $\text{InPlace}(\text{WS}, \text{EffWt}, \text{NPass})$ , where

WS = waste stream identifier

EffWt = effective weight of compaction vehicle exerted on in-place waste

NPass = number of passes by compaction vehicle

The effective weight, based on geometry and elementary physics, is the weight of the vehicle multiplied by the cosine of the slope angle (the angle of the finished surface).

The modeling proceeds in two steps. First, based on published data and landfill reports, we model in-place density for an average mixed municipal solid waste stream; this involves logistic functions in both effective weight and in number of passes, reflecting the existence of saturation effects. There are five constant parameters required, K1 through K5:

$$\text{DefaultInPlace}(\text{EffWt}, \text{NPass}) = K1 / [(1 + K2 * \text{EXP}(-K3 * \text{EffWt})) * (1 + K4 * \text{EXP}(-K5 * \text{NPass}))]$$

Second, to allow variation for different waste streams, we add two further parameters:

AsDelivered(WS) = Waste stream density when dumped at landfill

Compact(WS) = Relative compaction (where default waste stream compaction = 1.0)

Both parameters can if desired be estimated by the in-truck compaction model presented above. AsDelivered(WS) can be assumed to equal the uncompacted density for a given waste stream composition; this assumes either no in-truck compaction, or expansion back to uncompacted density when dumped, neither of which is perfectly realistic. Compact(WS) can be derived as the ratio of truck-compacted to loose density for a waste stream, relative to the same ratio for the default waste stream; however, the model user may also experiment with other values.

Then the complete model is:

$$\text{InPlace}(\text{WS}, \text{EffWt}, \text{NPass}) =$$

$$\text{AsDelivered}(\text{WS}) * [\text{DefaultInPlace}(\text{EffWt}, \text{NPass}) / \text{AsDelivered}(\text{Default})]^{\text{Compact}(\text{WS})}$$

Note that when Compact = 0, no compaction can occur, and in-place density equals as-delivered density. When Compact = 1, the estimated in-place density is proportional to the DefaultInPlace estimate, scaled up or down for changes in as-delivered density.

Does as-delivered density equal uncompacted density? (Y/N)  
 If N, enter as-delivered density (lbs/cu yd)

Weight of compacting vehicle (enter in lbs. no commas)  
 Number of passes made by compacting vehicle (default = 5)  
 Express angle of slope or finished surface as X:1 (i.e., enter X)

Calculated compactibility relative to default value  
 Use calculated compactibility (Y/N)?  
 If N, enter compactibility relative to default waste stream = 1.0

**User entries:**

Y
66845
7
3
0.87
Y

**Constants for landfill density model**

	Defaults	Alternative values
K1	1680	1635
K2	3.50	3.40
K3	6.30E-05	4.20E-05
K4	3.00	0.55
K5	0.60	0.25

**Intermediate calculations**

Cosine of slope angle	0.95
First term (weight, angle effects)	1.06
Second term (number of passes)	1.04
Default in-place density	1510.38
Default as-delivered density	391.00
Actual as-delivered density	521.82
Compactibility	0.87

<b>Estimated in-place density</b>	<b>1692.48</b>
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### **Test Results of the Three Models:**

- 1 Simple Model & Model 2 - Redwood Sanitary Landfill**
- 2 Simple Model & Model 2 - Bee Canyon Landfill**
- 3 Simple Model & Model 2 - Rural Landfill**
- 4 In-Place Model - 18 California Landfills**

# IN-TRUCK DENSITY MODEL: Redwood Landfill, Marin County

December 11, 1991

Estimated In-Truck Density:

RL	FL	CRO	OTR	Units
724	525	480	680	400
(lb/ cu yd)				

#	Truck Type	Capacity (cu yd)	% Full	Simple Model		Model 2	Incoming weight	Tare weight
				Actual weight (lb)	Estimated weight (lb)	Estimated weight (lb)		
1	RL	20	100%	11,520	10,500	14,476	38,080	26,560
2	OTR	30	80%	6,180	9,600	17,372	30,820	24,640
3	FL	42	100%	36,480	20,160	30,401	55,260	18,780
4	RL	18	75%	7,320	7,088	9,772	27,860	20,540
5	RL	16	100%	6,960	8,400	11,581	26,460	19,500
6	OTR	20	75%	27,620	6,000	10,857	54,000	26,380
7	RL	18	100%	5,820	9,450	13,029	28,180	22,360
8	RL	10	100%	2,720	5,250	7,238	18,540	15,820
9	RL	18	80%	6,080	7,560	10,423	27,200	21,120
10	RL	20	80%	14,260	8,400	11,581	45,120	30,860
11	RL	15	100%	7,880	7,875	10,857	28,460	20,580
12	FL	42	100%	3,580	20,160	30,401	40,020	36,440
13	RL	25	80%	13,540	10,500	14,476	42,340	28,800
14	FL	38	80%	11,240	14,592	22,004	43,680	32,440
15	OTR	18	80%	2,060	5,760	10,423	23,680	21,620
16	RL	25	80%	12,940	10,500	14,476	41,900	28,960
17	RL	20	80%	11,620	8,400	11,581	37,700	26,080
18	RL	20	80%	3,300	8,400	11,581	24,340	21,040
19	RL	20	100%	8,180	10,500	14,476	34,700	26,520
20	RL	25	80%	14,960	10,500	14,476	45,240	30,280
21	RL	20	100%	15,300	10,500	14,476	45,580	30,280
22	RL	25	80%	7,820	10,500	14,476	40,020	32,200
23	OTR	15	100%	9,900	6,000	10,857	36,220	26,320
24	OTR	15	90%	2,640	5,400	9,772	23,780	21,140
25	OTR	20	100%	5,020	8,000	14,476	29,860	24,840
26	RL	25	80%	13,020	10,500	14,476	44,860	31,840
27	OTR	40	0.8	7,340	12,800	23,162	33,720	26,380
28	RL	25	80%	14,000	10,500	14,476	44,060	30,060
29	CRO	15	100%	11,560	10,200	10,857	40,140	28,580
30	RL	20	75%	14,380	7,875	10,857	44,900	30,520
31	CRO	20	80%	9,440	10,880	11,581	38,080	28,640
32	FL	42	100%	15,920	20,160	30,401	52,500	36,580
33	CRO	20	80%	8,620	10,880	11,581	37,620	29,000
34	RL	20	80%	11,020	8,400	11,581	39,620	28,600
35	RL	20	100%	13,220	10,500	14,476	41,820	28,600
36	RL	20	80%	5,480	8,400	11,581	34,320	28,840

## IN-TRUCK DENSITY MODEL: Redwood Landfill, Marin County

Day: December 11, 1991

Estimated In-Truck Density:

IRL	FL	CRO	OTR	Units
724	525	480	680	400
(lb/cu.yd)				

#	Truck Type	Capacity (cu.yd)	% Full	Simple Model		Model 2	Incoming weight	Tare weight
				Actual weight (lb)	Estimated weight (lb)	Estimated weight (lb)		
37	RL	15	75%	10,600	5,906	8,143	37,400	26,800
38	RL	20	75%	9,280	7,875	10,857	36,660	27,380
39	RL	25	60%	15,260	7,875	10,857	48,120	32,860
40	RL	15	80%	4,660	6,300	8,686	24,100	19,440
41	RL	20	100%	13,480	10,500	14,476	41,940	28,460
42	RL	20	75%	9,420	7,875	10,857	39,960	30,540
43	RL	25	80%	13,900	10,500	14,476	45,500	31,600
44	RL	20	100%	7,460	10,500	14,476	35,760	28,300
45	RL	18	75%	6,900	7,088	9,772	28,320	21,420
46	RL	20	80%	7,900	8,400	11,581	31,080	23,180
47	RL	20	75%	10,060	7,875	10,857	38,440	28,380
48	RL	20	75%	8,820	7,875	10,857	34,360	25,540
49	RL	20	80%	11,080	8,400	11,581	36,340	25,260
50	RL	25	60%	13,940	7,875	10,857	45,580	31,640
51	OTR	48	100%	11,720	19,200	34,743	38,380	26,660
52	RL	25	100%	15,540	13,125	18,096	45,800	30,260
53	FL	38	80%	12,220	14,592	22,004	44,760	32,540
54	RL	18	100%	8,720	7,088	9,772	29,280	20,560
55	RL	18	100%	9,500	9,450	13,029	31,780	22,280
56	RL	18	100%	10,560	9,450	13,029	33,020	22,460
57	OTR	50	100%	16,520	20,000	36,191	43,200	26,680
58	RL	18	100%	11,040	9,450	13,029	32,280	21,240
59	OTR	20	80%	4,020	6,400	11,581	30,140	26,120
60	RL	25	90%	10,520	11,813	16,286	39,780	29,260
61	OTR	15	100%	1,900	6,000	10,857	24,580	22,680
62	OTR	15	80%	2,680	4,800	8,686	24,000	21,320

Daily Total Weights

636,640

607,300

886,212

PERCENT ERROR

-4.61%

39.20%

Conversion Factor Study: In-Vehicle and In-Place Waste Densities, Table 1-18.

## IN-TRUCK DENSITY MODEL

Estimated density (lb/cu yd): 724

## Marin County

Material Type	Waste stream Percent by weight	Density uncompacted (lb/cu yd)	Density compacted (lb/cu yd)	Zero Compaction Percentage	Intermediate calculations		
	p	d	c	z	q	m	p*m
<b>Paper:</b>							
Corrugated Containers	5.90%	33	360		0.06	359.75	21
Mixed Paper	4.40%	484	613		0.04	612.50	27
Newspaper	1.30%	323	552		0.01	551.50	7
High Grade Ledger	9.40%	364	644		0.09	644.00	61
Other Paper	9.70%	570	635		0.10	635.00	62
<b>Plastics:</b>							
HDPE	0.30%	35	264		0.00	263.75	1
PET	0.20%	39	182		0.00	182.00	0
Film Plastics	4.00%	23	226		0.04	226.00	9
Other Plastics	4.00%	50	372		0.04	371.62	15
<b>Glass:</b>							
Recyclable	2.90%	455	1258	30%		455.38	13
Non-recyclable	0.20%	566	1258	30%		566.00	1
<b>Metals:</b>							
Aluminum Cans	0.30%	91	399		0.00	399.00	1
Ferrous	2.50%	141	501		0.03	501.00	13
Non-Ferrous	0.60%	1248	1248		0.01	1248.32	7
White Goods		255	255			255.40	
<b>Organics:</b>							
Yardwaste	17.00%	292	584		0.17	584.20	99
Other Bio-organic	11.60%	1013	1080		0.12	1080.00	125
Other Nonbio-organic	6.15%	540	648		0.06	648.00	40
Textiles	1.20%	247	540		0.01	540.00	6
Leather	1.20%	380	759		0.01	759.30	9
Woodwaste	6.80%	333	333		0.07	332.65	23
<b>Other Waste:</b>							
Inert Solids	7.80%	1975	1975		0.08	1974.85	154
HHW	0.40%	1523	1523		0.00	1522.70	6
<b>Special Wastes:</b>							
Sewage Sludge		1294	1294			1293.75	
Ash	1.70%	1350	1350		0.02	1350.00	23
Auto Shredder Waste		800	800			800.00	
Dewatered Sludge		1615	1615			1614.60	
Tannery Sludge		NA					
Drilling Mud		NA					
Mine Tailings		NA					

TOTAL

99.55%

TOTAL COMPACTED DENSITY

724

Source: Marin County Solid Waste Management Plan, Beck &amp; Assoc, Table 2.4, 8/91.

TRUCK DENSITY MODEL: Redwood Landfill, Marin County

Day: December 12, 1991

Estimated In-Truck Density:

	RL	FL	CRO	OTR	Units
	724	525	480	680	400 (lb/cu yd)

#	Truck Type	Capacity (cu yd)	% Full	Actual weight (lb)	Simple Model	Model 2	Incoming weight	Tare weight
					Estimated weight (lb)	Estimated weight (lb)		
1	OTR	15	80%	1,280	4,800	6,300	23,060	21,780
2	RL	20	75%	10,470	7,875	7,875	40,990	30,520
3	RL	15	75%	10,360	5,906	5,906	37,280	26,920
4	RL	20	75%	7,020	7,875	7,875	35,380	28,360
5	RL	20	100%	11,900	10,500	10,500	40,520	28,620
6	RL	25	70%	7,740	9,188	9,188	44,440	36,700
7	RL	15	80%	4,300	6,300	6,300	23,740	19,440
8	RL	20	75%	10,420	7,875	7,875	37,800	27,380
9	RL	20	75%	11,360	7,875	7,875	36,920	25,560
10	RL	18	80%	16,200	7,560	7,560	42,200	26,000
11	RL	25	80%	14,020	10,500	10,500	45,660	31,640
12	RL	20	100%	14,420	10,500	10,500	42,900	28,480
13	RL	20	80%	8,660	8,400	8,400	31,820	23,160
14	RL	20	80%	9,060	8,400	8,400	38,040	28,980
15	RL	25	60%	15,400	7,875	7,875	48,620	33,220
16	RL	20	80%	11,820	8,400	8,400	37,560	25,740
17	CRO	25	80%	14,560	13,600	10,500	41,680	27,120
18	RL	18	75%	7,340	7,088	7,088	27,960	20,620
19	RL	18	100%	10,320	9,450	9,450	32,560	22,240
20	RL	18	100%	11,000	9,450	9,450	33,260	22,260
21	RL	18	100%	12,320	9,450	9,450	33,540	21,220
22	FL	30	90%	21,320	14,175	14,175	56,540	35,220
23	OTR	15	90%	2,280	5,400	7,088	24,000	21,720
24	RL	20	100%	10,180	10,500	10,500	35,420	25,240
25	RL	20	100%	11,860	10,500	10,500	33,040	21,180
26	RL	18	100%	6,580	9,450	9,450	27,200	20,620
27	RL	18	100%	4,480	9,450	9,450	25,660	21,180
28	OTR	20	75%	19,240	6,000	7,875	43,640	24,400
29	RL	18	100%	8,080	9,450	9,450	30,260	22,180
30	RL	18	90%	7,280	8,505	8,505	26,740	19,460
31	RL	20	90%	540	9,450	9,450	22,900	22,360
32	RL	20	90%	21,394	9,450	9,450	45,080	23,686
33	RL	20	100%	7,960	10,500	10,500	28,520	20,560
34	RL	20	100%	11,280	10,500	10,500	42,180	30,900
35	RL	25	90%	14,540	11,813	11,813	43,360	28,820
36	RL	18	90%	8,140	8,505	8,505	29,160	21,020

# IN-TRUCK DENSITY MODEL: Redwood Landfill, Marin County

December 12, 1991  
Estimated In-Truck Density:

	RL	FL	CRO	OTR	Units
	724	525	480	680	400 (lb/ cu yd)

#	Truck Type	Capacity (cu yd)	% Full	Actual weight (lb)	Simple Model Estimated weight (lb)	Model 2 Estimated weight (lb)	Incoming weight	Tare weight
37	RL	20	90%	8,140	9,450	9,450	34,220	26,080
38	RL	25	90%	15,460	11,813	11,813	46,080	30,620
39	RL	20	90%	9,020	9,450	9,450	34,220	25,200
40	FL	30	80%	17,500	11,520	12,600	52,660	35,160
41	RL	25	80%	12,640	10,500	10,500	44,400	31,760
42	RL	20	75%	7,600	7,875	7,875	28,680	21,080
43	RL	20	80%	7,660	8,400	8,400	32,860	25,200
44	RL	25	80%	14,600	10,500	10,500	45,860	31,260
45	RL	25	80%	10,540	10,500	10,500	42,720	32,180
46	RL	25	80%	6,960	10,500	10,500	37,100	30,140
47	FL	18	60%	10,100	5,184	5,670	45,200	35,100
48	OTR	30	90%	5,760	10,800	14,175	28,840	23,080
49	RL	25	90%	10,680	11,813	11,813	39,980	29,300
50	OTR	30	100%	16,800	12,000	15,750	43,040	26,240
Daily Total Weights				528,584	462,818	473,471		
PERCENT ERROR					-12.44%	-10.43%		
Two Day Totals				1,165,224	1,070,118	1,359,683		
PERCENT ERROR					-8.16%	16.69%		

Conversion Factor Study: In-Vehicle and In-Place Waste Densities, Table 1-18.

## N-TRUCK DENSITY MODEL--Model 2:

IFORNIA DEFAULT

Estimated density (lb/cu.yd): 688

Material Type	Waste stream Percent by weight	Density uncompacted (lb/cu.yd)	Density compacted (lb/cu.yd)	Zero Compaction Percentage	Intermediate calculations		
	p	d	c	z	q	m	p*m
<b>Paper:</b>							
Corrugated Containers	8.00%	33	360	0%	0.08	359.75	29
Mixed Paper	6.00%	484	613	0%	0.06	612.50	37
Newspaper	9.00%	323	552	0%	0.09	551.50	50
High Grade Ledger	1.00%	364	644	0%	0.01	644.00	6
Other Paper	12.00%	570	635	0%	0.12	635.00	76
<b>Plastics:</b>							
HDPE	1.00%	35	264	0%	0.01	263.75	3
PET	0.00%	39	182	0%	0.00	182.00	0
Film Plastics	2.00%	23	226	0%	0.02	222.88	4
Other Plastics	3.00%	50	372	0%	0.03	222.88	7
<b>Glass:</b>							
Recyclable	6.00%	455	1258	30%	0.00	455.38	27
Non-recyclable	1.00%	566	1258	30%	0.00	566.00	6
<b>Metals:</b>							
Aluminum Cans	1.00%	91	399	0%	0.01	399.00	4
Ferrous	4.00%	141	501	0%	0.04	501.00	20
Non-Ferrous	1.00%	1248	1248	0%	0.01	1248.32	12
White Goods	1.00%	255	255	0%	0.01	255.40	3
<b>Organics:</b>							
Yardwaste	19.00%	292	584	0%	0.19	584.20	111
Other Bio-organic	8.00%	1013	1080	0%	0.08	1080.00	86
Other Nonbio-organic	2.00%	540	648	0%	0.02	648.00	13
Textiles	2.00%	247	540	0%	0.02	540.00	11
Leather	1.00%	380	759	0%	0.01	759.30	8
Woodwaste	3.00%	333	333	0%	0.03	332.65	10
<b>Other Waste:</b>							
Inert Solids	7.00%	1975	1975	0%	0.07	1974.85	138
HHW	1.00%	1523	1523	0%	0.01	1522.70	15
<b>Special Wastes:</b>							
Sewage Sludge		1294	1294	0%	0.00	1293.75	0
Ash	0.33%	1350	1350	0%	0.00	1350.00	5
Auto Shredder Waste	0.33%	800	800	0%	0.00	800.00	3
Dewatered Sludge	0.33%	1615	1615	0%	0.00	1614.60	5
Tannery Sludge		NA					
Filtering Mud		NA					
Sludge Tailings		NA					

TOTAL 100.00%

TOTAL COMPACTED DENSITY 688

# IN-TRUCK DENSITY MODEL: Bee Canyon Landfill, Orange County

Day: January 15-16, 1992

Estimated In-Truck Density:

RL	FL	CRO	OTR	Units
688	525	480	680	400 (lb/ cu yd)

#	Truck Type	Capacity (cu yd)	% Full	Simple Model		Model 2	Incoming weight	Tare weight
				Actual weight (lb)	Estimated weight (lb)	Estimated weight (lb)		
1	FL	36	100%	19,120	17,280	24,782	54,740	35,620
2	OTR	30	100%	13,480	12,000	20,651	43,660	30,180
3	OTR	35	80%	4,820	11,200	19,275	39,160	34,340
4	FL	36	75%	11,700	12,960	18,586	42,500	30,800
5	OTR	35	100%	8,720	14,000	24,093	37,240	28,520
6	FL	30	95%	20,640	13,680	19,619	53,960	33,320
7	FL	30	80%	17,320	11,520	16,521	50,560	33,240
8	FL	30	95%	19,060	13,680	19,619	52,920	33,860
9	OTR	35	60%	13,180	8,400	14,456	41,880	28,700
10	FL	36	100%	18,400	17,280	24,782	51,960	33,560
11	FL	39	100%	18,920	18,720	26,847	52,120	33,200
12	OTR	40	50%	13,880	8,000	13,768	39,860	25,980
13	FL	35	100%	20,100	16,800	24,093	52,780	32,680
14	FL	35	75%	18,320	12,600	18,070	51,560	33,240
15	FL	35	100%	19,720	16,800	24,093	51,420	31,700
16	OTR	30	25%	5,340	3,000	5,163	33,640	28,300
17	OTR	40	60%	11,420	9,600	16,521	39,720	28,300
18	OTR	40	20%	3,760	3,200	5,507	32,980	29,220
19	OTR	40	80%	16,740	12,800	22,028	46,100	29,360
20	OTR	39	100%	8,500	15,600	26,847	35,040	26,540
21	OTR	35	75%	3,040	10,500	18,070	30,960	27,920
22	OTR	40	35%	5,600	5,600	9,637	33,160	27,560
23	FL	35	75%	12,380	12,600	18,070	47,540	35,160
24	FL	35	50%	9,240	8,400	12,047	40,940	31,700
25	OTR	10	100%	3,120	4,000	6,884	13,080	9,960
26	FL	35	60%	12,740	10,080	14,456	44,880	32,140
27	FL	39	80%	18,640	14,976	21,478	52,500	33,860
28	OTR	20	80%	16,740	6,400	11,014	43,900	27,160
29	OTR	35	100%	12,980	14,000	24,093	41,920	28,940
30	OTR	20	100%	9,780	8,000	13,768	37,120	27,340
31	OTR	35	50%	14,100	7,000	12,047	41,540	27,440
32	OTR	40	100%	13,600	16,000	27,535	43,000	29,400
33	FL	39	100%	20,300	18,720	26,847	55,240	34,940
34	OTR	40	50%	15,940	8,000	13,768	44,900	28,960
35	FL	39	75%	15,780	14,040	20,135	49,640	33,860
36	FL	40	100%	20,240	19,200	27,535	52,380	32,140

# IN-TRUCK DENSITY MODEL: Bee Canyon Landfill, Orange County

Day: January 15-16, 1992

Estimated In-Truck Density:

	RL	FL	CRO	OTR	Units
	688	525	480	680	400 (lb/ cu yd)

#	Truck Type	Capacity (cu yd)	% Full	Simple Model		Model 2	Incoming weight	Tare weight
				Actual weight (lb)	Estimated weight (lb)	Estimated weight (lb)		
37	FL	39	75%	16,080	14,040	20,135	51,700	35,620
38	OTR	35	100%	9,420	14,000	24,093	35,400	25,980
39	FL	39	85%	19,340	15,912	22,820	53,340	34,000
40	FL	39	100%	16,900	18,720	26,847	50,100	33,200
41	OTR	30	35%	5,200	4,200	7,228	33,540	28,340
42	FL	35	100%	17,140	16,800	24,093	48,980	31,840
43	FL	39	100%	18,700	18,720	26,847	53,800	35,100
44	OTR	40	50%	11,580	8,000	13,768	41,080	29,500
45	FL	39	90%	21,100	16,848	24,162	52,080	30,980
46	FL	36	75%	15,140	12,960	18,586	48,380	33,240
47	FL	36	80%	15,560	13,824	19,825	48,240	32,680
48	FL	36	75%	13,900	12,960	18,586	47,760	33,860
49	FL	36	75%	14,220	12,960	18,586	45,920	31,700
50	FL	36	75%	14,620	12,960	18,586	48,180	33,560
51	FL	36	75%	15,740	12,960	18,586	49,220	33,480
52	OTR	20	100%	13,480	8,000	13,768	42,180	28,700
53	OTR	30	50%	7,800	6,000	10,326	39,580	31,780
54	FL	39	100%	7,800	18,720	26,847	39,580	31,780
55	FL	39	50%	13,460	9,360	13,423	48,560	35,100
56	FL	39	25%	8,740	4,680	6,712	44,320	35,580
57	OTR	30	50%	3,300	6,000	10,326	29,820	26,520
58	FL	36	75%	15,160	12,960	18,586	48,400	33,240
59	FL	36	100%	12,680	17,280	24,782	44,380	31,700
60	FL	36	65%	7,560	11,232	16,108	38,400	30,840
61	OTR	30	50%	8,260	6,000	10,326	40,040	31,780
62	OTR	40	100%	18,740	16,000	27,535	46,000	27,260
63	OTR	30	100%	12,980	12,000	20,651	41,560	28,580
64	OTR	40	75%	16,740	12,000	20,651	45,440	28,700
65	FL	36	75%	11,960	12,960	18,586	45,200	33,240
66	FL	36	50%	15,380	8,640	12,391	47,080	31,700
67	FL	39	75%	9,840	14,040	20,135	43,040	33,200
68	OTR	30	75%	7,300	9,000	15,489	36,240	28,940
69	OTR	40	100%	17,040	16,000	27,535	45,280	28,240
70	OTR	40	75%	10,000	12,000	20,651	38,020	28,020
71	OTR	30	50%	4,400	6,000	10,326	32,460	28,060
72	FL	36	50%	3,260	8,640	12,391	36,480	33,220

# IN-TRUCK DENSITY MODEL: Bee Canyon Landfill, Orange County

Day: January 15-16, 1992

Estimated In-Truck Density:

RL	FL	CRO	OTR	Units
688	525	480	680	400
(lb/ cu yd)				

#	Truck Type	Capacity (cu yd)	% Full	Simple Model		Model 2	Incoming weight	Tare weight
				Actual weight (lb)	Estimated weight (lb)	Estimated weight (lb)		
73	FL	36	50%	11,180	8,640	12,391	42,480	31,300
74	FL	36	75%	14,400	12,960	18,586	45,460	31,060
75	FL	36	75%	16,860	12,960	18,586	51,480	34,620
76	OTR	40	100%	9,300	16,000	27,535	37,540	28,240
77	OTR	30	100%	24,820	12,000	20,651	49,260	24,440
78	FL	30	75%	14,720	10,800	15,489	48,580	33,860
79	OTR	40	50%	5,620	8,000	13,768	31,280	25,660
80	OTR	30	50%	6,060	6,000	10,326	36,680	30,620
81	OTR	30	90%	2,640	10,800	18,586	29,540	26,900
82	OTR	20	100%	27,140	8,000	13,768	62,760	35,620
83	FL	36	100%	20,480	17,280	24,782	55,640	35,160
84	FL	36	95%	19,140	16,416	23,543	54,720	35,580
85	FL	36	55%	13,620	9,504	13,630	43,760	30,140
86	FL	30	60%	17,260	8,640	12,391	50,860	33,600
87	OTR	40	20%	7,340	3,200	5,507	34,720	27,380
88	OTR	35	10%	3,820	1,400	2,409	31,340	27,520
89	OTR	40	40%	9,340	6,400	11,014	38,840	29,500
90	OTR	21	30%	6,860	2,520	4,337	33,640	26,780
91	OTR	35	30%	9,740	4,200	7,228	36,960	27,220
92	OTR	40	10%	2,560	1,600	2,754	31,100	28,540
93	OTR	21	110%	28,400	9,240	15,902	54,200	25,800
94	OTR	40	40%	8,120	6,400	11,014	36,120	28,000
95	FL	36	100%	22,260	17,280	24,782	56,880	34,620

Daily Total Weights	1,239,560	1,070,252	1,651,979
PERCENT ERROR		-13.66%	33.27%
			$\frac{16}{49}$

Conversion Factor Study: In-Vehicle and In-Place Waste Densities, Table 1-18.

# TRUCK DENSITY MODEL: Simple Model and Model 2

Rural County: 50% Self-Haul; 25% Rear Loaders; 25% Front Loaders (Commercial)

	MP	FP	RL	FL	CRO	OTR	Units
Estimated In-Truck Density:	688	294	316	525	480	680	400 (lb/cu.yd)

#	Truck Type	Capacity (cu.yd)	%Full	Simple Model	Model 2	Incoming weight	Tare weight
				Actual weight (lb)	Estimated weight (lb)		
1	RL	20	100%	11,520	10,500	13,768	26,560
2	RL	20	75%	9,280	7,875	10,326	27,380
3	RL	25	60%	15,260	7,875	10,326	32,860
4	RL	18	75%	7,320	7,088	9,293	20,540
5	RL	16	100%	6,960	8,400	11,014	19,500
6	RL	15	80%	4,660	6,300	8,261	19,440
7	RL	18	100%	5,820	9,450	12,391	22,360
8	RL	10	100%	2,720	5,250	6,884	15,820
9	RL	18	80%	6,080	7,560	9,913	21,120
10	RL	20	80%	14,260	8,400	11,014	30,860
11	RL	15	100%	7,880	7,875	10,326	20,580
12	RL	20	100%	13,480	10,500	13,768	28,460
13	RL	25	80%	13,540	10,500	13,768	28,800
14	FL	30	75%	14,920	10,800	15,489	33,860
15	FL	30	95%	19,060	13,680	19,619	33,860
16	FL	35	50%	9,240	8,400	12,047	31,700
17	FL	35	60%	12,740	10,080	14,456	32,140
18	FL	39	80%	18,640	14,976	21,478	33,860
19	FL	39	100%	10,300	18,720	26,847	34,940
20	FL	39	25%	15,780	4,680	6,712	33,860
21	FL	40	100%	20,240	19,200	27,535	32,140
22	FL	39	100%	16,900	18,720	26,847	33,200
23	FL	35	100%	17,120	16,800	24,093	31,860
24	FL	2.55	90%	21,100	1,080	1,549	30,980
25	FL	40	90%	14,880	17,280	24,782	31,400
26	FP	2.55	100%	800	790	1,721	5,400
27	FP	22	75%	380	474	1,033	5,760
28	FP	2.55	60%	2,140	474	1,033	5,320
29	FP	2.55	80%	720	632	1,377	5,020
30	FP	22	62%	380	392	854	4,380
31	FP	22	50%	600	316	688	3,900
32	FP	22	100%	1,740	632	1,377	4,660
33	FP	2.55	100%	800	790	1,721	4,540
34	FP	1.75	100%	2,640	553	1,205	4,360
35	FP	2.5	20%	610	158	344	5,560

# IN-TRUCK DENSITY MODEL: Simple Model and Model 2

Rural County: 50% Self Haul, 25% Rear Loaders, 25%Front Loaders(Commercial)

	MP	FP	RL	FL	CRO	OTR	Units
Estimated In-Truck Density:	688	294	316	525	480	680	400 ( lb/cu yd)

#	Truck Type	Capacity (cu yd)	% Full	Simple Model		Model 2	Incoming weight	Tare weight
				Actual weight (lb)	Estimated weight (lb)	Estimated weight (lb)		
36	FP	2	75%	1,080	474	1,033	5,400	4,320
37	FP	2	100%	680	632	1,377	5,480	4,800
38	FP	2	100%	160	632	1,377	4,980	4,820
39	MP	1.25	100%	1,160	368	860	4,000	2,840
40	MP	1.5	66%	520	291	681	3,260	2,740
41	MP	1.25	80%	3,720	294	688	6,420	2,700
42	MP	1.5	20%	120	88	207	4,060	3,940
43	MP	1.5	100%	140	441	1,033	3,100	2,960
44	MP	1.5	100%	360	441	1,033	3,660	3,300
45	MP	2.5	40%	260	294	688	3,460	3,200
46	MP	1.75	86%	508	442	1,036	3,928	3,420
47	MP	1.5	100%	60	441	1,033	2,800	2,740
48	MP	1.5	100%	520	441	1,033	5,720	5,200
49	MP	1.25	100%	460	368	860	3,480	3,020
50	MP	1.5	100%	200	441	1,033	3,600	3,400

Daily Total Weights	330,458	273,287	387,824
PERCENT ERROR		-17.30%	17.36%

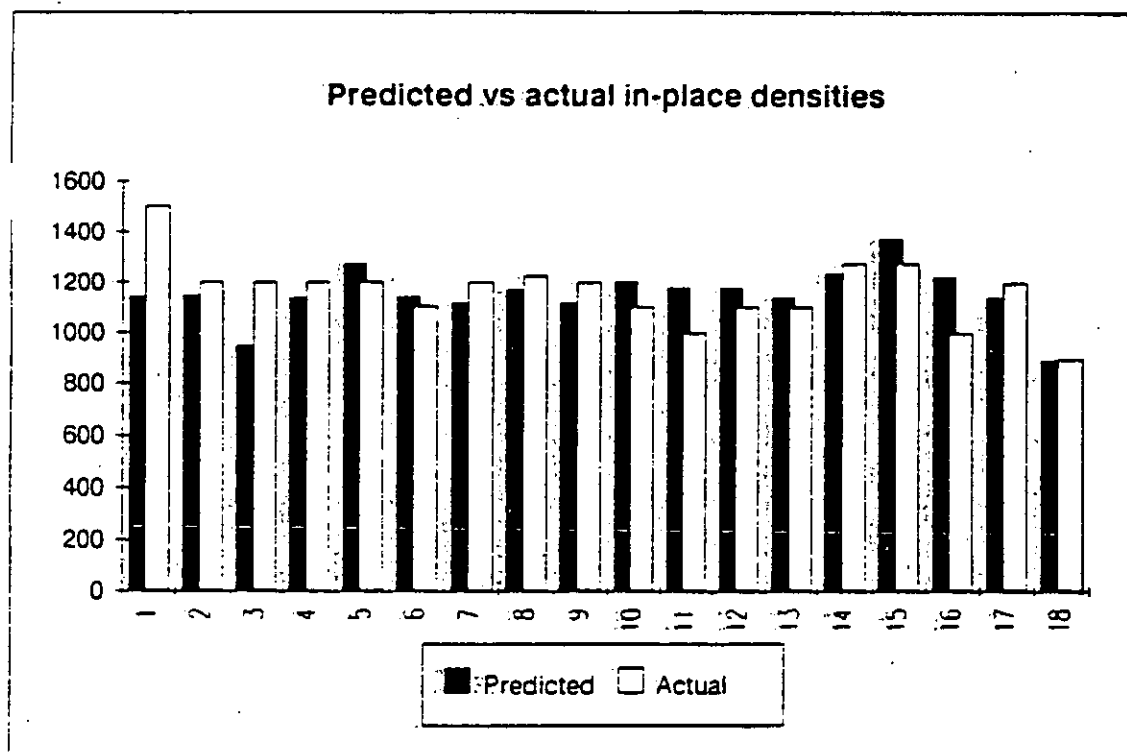
Conversion Factor Study: In-Vehicle and In-Place Waste Densities, Tables 1-16 and 1-18.

## IN-PLACE DENSITY MODEL

Calculates in-place density as function of compaction vehicle weight, number of passes, and slope angle.

ESTIMATED CONSTANTS		ORIGINAL VALUES
K1	1635	1680
K2	3.40	3.50
K3	-4.20E-05	-6.30E-05
K4	0.55	3.00
K5	0.25	0.60

DIAGNOSTICS	
Average error	12.73
Standard deviation	136.85
Ave abs % error	3.79%



# IN-PLACE DENSITY MODEL

Entry Number	1	2	3	4	5	6	7	8	9
<b>INPUTS:</b>									
Vehicle weight (lbs)	66,845	66,230	39,800	74,900	79,000	66,845	81,000	66,845	66,845
Number of passes	5	5	9	3.5	6	5	2.5	7	4
Slope angle of surface or finished grade									
enter either as ratio X:1 == >	3	3.5	0	3	3	3	3	2	5
or in degrees == >									
<b>CALCULATIONS:</b>									
angle (radians)	0.32	0.28	0.00	0.32	0.32	0.32	0.32	0.46	0.20
cosine	0.95	0.96	1.00	0.95	0.95	0.95	0.95	0.89	0.98
first exponential	1.24	1.23	1.64	1.17	1.15	1.24	1.13	1.28	1.22
second exponential	1.16	1.16	1.06	1.23	1.12	1.16	1.29	1.10	1.20
in-place density	1142	1144	943	1135	1271	1142	1113	1170	1118
Actual	1500	1200	1200	1200	1200	1100	1200	1224	1200
Difference	358	56	257	65	-71	-42	87	54	82
% Difference ((A-O)/A)	31%	5%	27%	6%	-6%	-4%	8%	5%	7%

Entry Number	10	11	12	13	14	15	16	17	18
<b>INPUTS:</b>									
Vehicle weight (lbs)	66,845	66,845	66,845	66,845	66,845	84,900	81,000	66,845	42,230
Number of passes	6	6	6	6	9	9	4.5	5	6
Slope angle of surface or finished grade									
enter either as ratio X:1 == >	7.7	3	3	2	2.5	2.5	3	3	3
or in degrees == >									
<b>CALCULATIONS:</b>									
angle (radians)	0.13	0.32	0.32	0.46	0.38	0.38	0.32	0.32	0.32
cosine	0.99	0.95	0.95	0.89	0.93	0.93	0.95	0.95	0.95
first exponential	1.21	1.24	1.24	1.28	1.25	1.12	1.13	1.24	1.63
second exponential	1.12	1.12	1.12	1.12	1.06	1.06	1.18	1.16	1.12
in-place density	1203	1177	1177	1141	1235	1375	1222	1142	892
Actual	1100	1000	1100	1100	1275	1275	1000	1200	898
Difference	-103	-177	-77	-41	40	100	-222	58	6
% Difference ((A-O)/A)	-9%	-15%	-7%	-4%	3%	-7%	-18%	5%	1%



3. CONSIDERATION OF ADOPTION OF EMERGENCY REGULATIONS REGARDING CITY, COUNTY AND REGIONAL AGENCY SOURCE REDUCTION AND RECYCLING ELEMENTS AND NONDISPOSAL FACILITY ELEMENTS
4. CONSIDERATION OF STAFF RECOMMENDATIONS ON THE STATUS REPORT DOCUMENT FORMAT
5. CONSIDERATION OF STAFF RECOMMENDATIONS CONCERNING THE DEVELOPMENT OF GUIDELINES FOR SUBMITTAL OF DOCUMENTATION FOR BASELINE DIVERSION CREDIT FOR RESTRICTED WASTES
6. CONSIDERATION OF THE MODEL FOR PREPARING A NONDISPOSAL FACILITY ELEMENT
7. CONSIDERATION OF STAFF RECOMMENDATIONS AND PUBLIC COMMENTS ON THE WEIGHT/VOLUME CONVERSION FACTOR STUDY FOR IN-VEHICLE AND IN-PLACE WASTE DENSITIES

115

117

135

152

THE FOLLOWING ITEMS WILL BE CONSIDERED ON THURSDAY, DECEMBER 9, 1993 AT 10:00 A.M.:

8. CONSIDERATION OF USED OIL RECYCLING BLOCK GRANT PROGRAM FUNDING RECOMMENDATIONS FOR 1993/1994
9. CONSIDERATION OF APPLICATION PACKAGE FOR LOCAL GOVERNMENT USED OIL OPPORTUNITY GRANT PROGRAM (OPPORTUNITY GRANTS)
10. CONSIDERATION OF USE OF WASTE-DERIVED MATERIAL FOR ALTERNATIVE DAILY COVER (ADC) AS IT PERTAINS TO DIVERSION MANDATES AND WASTE MANAGEMENT PLANNING REGULATIONS
11. OPEN DISCUSSION
12. ADJOURNMENT

280

286

301

**Notice:** The Committee may hold a closed session to discuss the appointment or employment of public employees and litigation under authority of Government Code Sections 11126 (a) and (q), respectively.

For further information contact:  
INTEGRATED WASTE MANAGEMENT BOARD  
8800 Cal Center Drive  
Sacramento, CA 95826

Catherine Foreman  
(916) 255-2156

**CALIFORNIA INTEGRATED WASTE MANAGEMENT BOARD**8800 Cal Center Drive  
Sacramento, California 95826

*Wesley Chesbro, Chairman*  
*Jesse R. Huff, Member*  
*Kathy Neal, Member*

**Tuesday, December 7, 1993**  
**10:00 a.m.**

**Thursday, December 9, 1993**  
**10:00 a.m.**

meeting of the

**LOCAL ASSISTANCE AND PLANNING COMMITTEE**

of the  
**CALIFORNIA INTEGRATED WASTE MANAGEMENT BOARD**

8800 Cal Center Drive  
Sacramento, CA 95826

**AGENDA**

Note: o Agenda items may be taken out of order.  
o If written comments are submitted, please provide 20 two-sided copies.

**Important Notice:** The Board intends that Committee Meetings will constitute the time and place where the major discussion and deliberation of a listed matter will be initiated. After consideration by the Committee, matters requiring Board action will be placed on an upcoming Board Meeting Agenda. Discussion of matters on Board Meeting Agendas may be limited if the matters are placed on the Board's Consent Agenda by the Committee. Persons interested in commenting on an item being considered by a Board Committee or the full Board are advised to make comments at the Committee meeting where the matter is considered.

**THE FOLLOWING ITEMS WILL BE CONSIDERED ON TUESDAY, DECEMBER 7, 1993 AT 10:00 A.M.:**

1. CONSIDERATION OF STAFF RECOMMENDATIONS ON THE ADEQUACY OF THE CONTRA COSTA COUNTYWIDE INTEGRATED WASTE MANAGEMENT PLAN
2. CONSIDERATION OF PETITION FOR REDUCTION IN THE DIVERSION REQUIREMENTS FOR THE CITY OF BISHOP, INYO COUNTY AND THE UNINCORPORATED COUNTY OF INYO

3. CONSIDERATION OF ADOPTION OF EMERGENCY REGULATIONS REGARDING CITY, COUNTY AND REGIONAL AGENCY SOURCE REDUCTION AND RECYCLING ELEMENTS AND NONDISPOSAL FACILITY ELEMENTS
4. CONSIDERATION OF STAFF RECOMMENDATIONS ON THE STATUS REPORT DOCUMENT FORMAT
5. CONSIDERATION OF STAFF RECOMMENDATIONS CONCERNING THE DEVELOPMENT OF GUIDELINES FOR SUBMITTAL OF DOCUMENTATION FOR BASELINE DIVERSION CREDIT FOR RESTRICTED WASTES
6. CONSIDERATION OF THE MODEL FOR PREPARING A NONDISPOSAL FACILITY ELEMENT
7. CONSIDERATION OF STAFF RECOMMENDATIONS AND PUBLIC COMMENTS ON THE WEIGHT/VOLUME CONVERSION FACTOR STUDY FOR IN-VEHICLE AND IN-PLACE WASTE DENSITIES

**THE FOLLOWING ITEMS WILL BE CONSIDERED ON THURSDAY, DECEMBER 9, 1993 AT 10:00 A.M.:**

8. CONSIDERATION OF USED OIL RECYCLING BLOCK GRANT PROGRAM FUNDING RECOMMENDATIONS FOR 1993/1994
9. CONSIDERATION OF APPLICATION PACKAGE FOR LOCAL GOVERNMENT USED OIL OPPORTUNITY GRANT PROGRAM (OPPORTUNITY GRANTS)
10. CONSIDERATION OF USE OF WASTE-DERIVED MATERIAL FOR ALTERNATIVE DAILY COVER (ADC) AS IT PERTAINS TO DIVERSION MANDATES AND WASTE MANAGEMENT PLANNING REGULATIONS
11. OPEN DISCUSSION
12. ADJOURNMENT

**Notice:** The Committee may hold a closed session to discuss the appointment or employment of public employees and litigation under authority of Government Code Sections 11126 (a) and (q), respectively.

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CALIFORNIA INTEGRATED WASTE MANAGEMENT BOARD

PLANNING COMMITTEE

December 9, 1993

AGENDA ITEM # 8

ITEM: CONSIDERATION OF USED OIL RECYCLING BLOCK GRANT PROGRAM  
FUNDING RECOMMENDATIONS FOR 1993/1994

BACKGROUND:

**Mandate.** The California Oil Recycling Enhancement Act (Statutes of 1991, Chapter 817) mandates the Board to collect \$0.16 per gallon from oil manufacturers on sales of new lubricating oil to fund activities discouraging the illegal disposal of used oil. Among the activities mandated by the Act are annual "block grants" to cities and counties for implementing local used oil collection programs (Public Resources Code (PRC) §48653(a)(4)).

**Program Funding.** The Act annually allocates \$10 million from the Used Oil Recycling Fund for Block Grants, or less if insufficient funding is available. The Act specifies grant awards are to be calculated by multiplying a jurisdiction's population by the fraction resulting from dividing \$10 million by the state's total population (\$0.3169 per resident for this grant cycle). Thus, unless every jurisdiction in the state applies for its Block Grant, the Board would not award the full \$10 million allocated for Block Grants. However, the Act directs unclaimed funds for use in other used oil grant programs (e.g., competitive grants to local governments -- see Agenda Item #10).

**Eligible Programs.** Regulations for the Used Oil Recycling Block Grant Program provide applicants with significant latitude in the types of programs eligible for funding. Block Grant funds may be used for any type of new or existing program that enhances recycling or the appropriate disposal of used oil within a jurisdiction (e.g., developing public or private collection centers, curbside collection, public education). Local governments can develop regional programs consisting of several cities and/or counties. Local governments can also develop programs that include partnerships with private, nonprofit, or other governmental organizations.

**Grant Eligibility.** Because Block Grants are not awarded competitively, applicants can anticipate receiving their grant as long as they submit a complete and reasonable proposal and demonstrate they meet Block Grant eligibility requirements (PRC §48691). Proposed programs must ensure that by no later than the end of the grant term (December 1994 for this grant cycle), one or a combination of the following eligibility criteria are met:

- Ensure that at least one publicly or privately certified

- used oil collection center is available for every 100,000 residents not serviced by curbside used oil collection, or
- Provide curbside collection at least once a month.

Additionally, proposed programs must include a public education program informing the public of locally available used oil collection opportunities.

**Program Development.** In February, 1993 two staff were assigned to initiate work on the Used Oil Grant Program. In May and June of 1993 program staff conducted seven workshops across the state attended by 210 local government officials and other interested parties. In June, 1993 the Board adopted regulations for parts of the Used Oil Program including the Block Grants (California Code of Regulations, Title 14, Section 18658 et seq.). From July through September program staff mailed Notices of Funding Availability (NOFAs) and/or applications to over 1000 interested parties and directly contacted representatives from over 200 jurisdictions to answer their questions and encourage their participation in the program. Local governments were required to submit applications by October 29, 1993.

#### **DISCUSSION:**

At the close of the application period staff received 98 applications representing 240 jurisdictions and funding requests totaling \$6.2 million dollars.

**Evaluation Process.** Applications were reviewed by a panel consisting of Used Oil Program grant and certification staff. The application review consisted of ensuring the applicant met the program eligibility requirements, reviewing the proposed program and budget to ensure it was reasonable, and reviewing the application package to ensure all required information and documents were included. Applicants with insufficient application materials were contacted by phone or mail and asked to supply necessary information or documents by December 1, 1993.

**Conditional Eligibility.** 58 Block Grant applicants claimed "conditional eligibility" for their programs. Conditional eligibility was established in regulation to allow jurisdictions to receive at least partial grant funding, even if they could not fully meet grant eligibility requirements by the application deadline (i.e., ensure one certified center per 100,000 residents or curbside collection). Conditional applicants must describe in their application how they will achieve all grant eligibility requirements by the end of the grant term. Jurisdictions claiming conditional eligibility are subject to a grant withhold of up to 50% until all eligibility requirements are achieved.

Used Oil Program staff will be working closely with conditional applicants to ensure they achieve grant eligibility requirements by the end of the grant term (December 1994).

**Public education.** Many Block Grant applicants intend to direct a substantial proportion of their grant funds toward public education activities. Program staff will encourage Block Grant recipients to coordinate their local public education efforts with the Board's statewide used oil education campaign when appropriate and as it becomes available. Program staff anticipate working closely with the Board's statewide used oil education staff to refine public education activities in future Block Grant cycles.

**Participation Rate.** Staff communications with local government officials during the spring and summer indicated many jurisdictions had limited or no interest in the Block Grant program. Staff believed this response was due to unfamiliarity with the Board's Used Oil Program and the difficulty many jurisdiction had meeting the Block Grant eligibility requirements with so few certified used oil collection centers in place statewide. To address these concerns, staff directly contacted representatives from over 200 jurisdictions to clarify their understanding of the program (especially about conditional eligibility) and encourage their participation. Program staff believes the 98 applicants encompassing approximately 63% of the state's population represent an excellent participation rate for the first year of this program. However, staff anticipates pursuing the following activities to increase participation rates for future grant cycles.

- In addition to mailing grant notices to local government staff and administrators involved with used oil, notices will be mailed to mayors, city managers, and county supervisors.
- Program staff will pursue additional simplification of the application process, especially for regional programs and applicants renewing funding for a program established in previous grant cycles.
- Program staff will compile information about the 1993/94 Block Grant proposals for dissemination to potential future applicants. Staff will also prepare or cite additional information resources that may assist applicants in developing and/or refining their local used oil collection programs.
- Program staff will ensure local officials are aware of all certified used oil collection centers located within their jurisdictions.

**STAFF RECOMMENDATION:**

Staff recommends the Planning Committee approve all grant applicants for funding and forward these funding recommendations to the Board for consideration at the December 15th Board Meeting.

**Attachments:**

1. List of 1993/94 Block Grant applicants.
2. Text of Board Resolution: "Approval of Used Oil Recycling Block Grants."

Prepared by: Chris Allen *CA* Phone: (916) 255-2136  
Reviewed by: Nguyen Van Hanh *NH* Phone: (916) 255-2437  
Reviewed by: Martha Gildart *MG* Phone: (916) 255-2619  
Reviewed by: Daniel Gorfain *DG* Phone: (916) 255-2319  
Legal review: Bob Conheim *BC* Date/Time: 11/23/93

**CALIFORNIA USED OIL RECYCLING BLOCK GRANT PROGRAM**  
**LIST OF APPLICANTS AND RECOMMENDED FUNDING -- 1993/1994 GRANT CYCLE**

Agoura Hills	\$6,639.83	Monterey County (Regional)	\$119,035.00
Antioch	\$22,000.00	Moorpark	\$8,462.22
Arcadia	\$10,641.02	Napa	\$20,791.00
Arcata and Eureka (Regional)	\$14,024.00	Oakland	\$121,291.84
Arroyo Grande	\$4,769.90	Orange	\$36,859.00
Atascadero	\$7,636.00	Paramount	\$16,449.00
Berkeley	\$33,246.00	Pasadena	\$41,625.00
Bi-County Integrated Waste Management Authority (Sutter/Yuba Counties)	\$42,390.00	Pico Rivera	\$19,079.00
Brentwood	\$3,066.37	Pismo Beach	\$2,503.80
Burbank	\$30,806.29	Pittsburg	\$15,973.63
Calaveras County (Regional)	\$11,641.10	Poway	\$14,690.00
Camarillo	\$17,870.00	Rancho Cucamonga	\$35,682.94
Carson	\$12,200.00	Redondo Beach/Manhattan Beach	\$29,100.00
Chino	\$19,428.25	Rialto	\$25,000.00
Coachella Valley Association of Governments (Regional)	\$65,920.00	Riverside	\$76,415.00
Compton	\$28,968.05	Riverside County (Unincorporated)	\$119,250.00
Concord	\$35,877.28	Sacramento	\$93,480.00
Contra Costa County (Regional)	\$143,390.28	Sacramento County	\$214,819.98
Costa Mesa	\$32,010.65	San Bernardino County (Unincorporated)	\$63,387.42
Covina	\$13,913.54	San Diego	\$371,323.53
Davis	\$15,878.00	San Diego County	\$135,237.00
Diamond Bar	\$17,209.69	San Francisco	\$238,336.71
El Cerrito	\$7,432.18	San Joaquin County (Regional)	\$149,280.00
El Dorado County (Regional)	\$44,640.59	San Jose	\$260,522.31
Fairfield	\$27,224.90	San Luis Obispo County and City of San Luis Obispo	\$43,578.00
Fremont	\$58,094.57	San Mateo County (Regional)	\$215,709.52
Fresno	\$124,100.00	San Ramon	\$12,328.85
Garden Grove	\$47,445.00	Santa Ana	\$97,743.00
Gardena	\$16,956.14	Santa Barbara County	\$37,278.00
Glendale	\$59,172.16	Santa Clara County (Regional)	\$196,324.00
Guadalupe	\$1,877.85	Santa Clarita	\$38,951.00
Hawthorne	\$23,421.65	Santa Cruz County (Regional)	\$75,098.25
Hayward	\$38,381.09	Santa Maria	\$21,139.71
Hemet	\$16,512.42	Shasta County	\$24,277.00
Huron	\$1,719.38	Siskiyou County (Regional)	\$14,320.00
Inglewood	\$13,250.00	Sonoma County Waste Management Agency (Regional)	\$131,940.92
Kingsburg	\$2,487.96	South Gate	\$28,000.00
La Canada Flintridge	\$6,211.00	Stanislaus County (Regional)	\$60,100.00
Lakewood	\$23,611.82	Sunnyvale	\$38,698.02
Lomita	\$6,210.00	Temple City	\$10,126.00
Long Beach/Signal Hill	\$141,496.00	Thousand Oaks	\$34,609.53
Los Angeles	\$1,143,414.00	Tuolumne County	\$15,260.52
Lynwood	\$20,030.00	Vallejo	\$36,640.00
Madera County and City of Madera	\$29,992.00	Ventura County and City of Ojai	\$31,487.70
Manteca	\$13,770.00	Walnut Creek	\$19,776.88
Marin County (Regional)	\$76,452.00	West Sacramento	\$9,500.00
Mendocino Solid Waste Management Authority (Regional)	\$26,361.25	West Side Cities (Los Angeles County)	\$30,561.00
Merced County (Regional)	\$61,311.49	Western Riverside Council of Governments (Regional)	\$108,741.13
Modesto	\$56,573.00	Westlake Village	\$2,416.65

**CALIFORNIA INTEGRATED WASTE MANAGEMENT BOARD**

**RESOLUTION 93-136**

**APPROVAL OF USED OIL RECYCLING BLOCK GRANTS**

**WHEREAS,** Public Resources Code (PRC) Section 48653 authorizes the Board to award grants to cities, based on the city's population, and counties, based on the population of the unincorporated area of the county for the implementation of local used oil collection programs adopted pursuant to Public Resources Code Section 48690; and

**WHEREAS,** Board staff solicited application for Used Oil Recycling Block Grants from September 1, 1993 through October 29, 1993; and

**WHEREAS,** 98 applications were received by the October 29, 1993 deadline; and

**WHEREAS,** Board staff reviewed the application to determine their conformance with the regulations in Title 14, California Code of Regulations, Sections 18659.1 and 18659.2; and

**WHEREAS,** Board staff has determined that [redacted] applications are eligible for funding and consideration of Used Oil Recycling Block Grant funding;

**NOW, THEREFORE, BE IT RESOLVED,** that the Board hereby approves the following [redacted] Used Oil Recycling Block grants in the following amounts in accordance with PRC Section 48653:

[List of name and award amount for each grantee]

**CERTIFICATION**

The undersigned Executive Director of the California Integrated Waste Management Board does hereby certify that the foregoing is a full, true, and correct copy of a resolution duly and regularly adopted at a meeting of the California Integrated Waste Management Board held December 15, 1993.

Dated:

Ralph E. Chandler  
Executive Director

**CALIFORNIA INTEGRATED WASTE MANAGEMENT BOARD**

**PLANNING COMMITTEE**

December 9, 1993

**AGENDA ITEM # 9**

**ITEM:** Consideration of application package for Local Government Used Oil Opportunity Grant Program

**ANALYSIS:**

The California Oil Recycling Enhancement Act (Statutes of 1991, Chapter 817) mandates the Board to collect \$0.16 per gallon from oil manufacturers on sales of new lubricating oil to fund activities discouraging the illegal disposal of used oil. This fee results in approximately \$5 million per quarter being deposited into the California Used Oil Recycling Fund to fund program activities.

After funds from the Used Oil Recycling Fund are expended on paying recycling incentive fees, CIWMB administrative costs, and Used Oil Block Grants, the Act allocates the remainder of the Fund to several other program activities. Forty percent or more of the remainder is allocated for additional grants to local governments (Public Resource Code (PRC) §48656 and §48632(a)). Used Oil Grant Program staff are developing these grants into the Local Government Used Oil Opportunity Grant Program (Opportunity Grant). Staff estimates approximately \$5 million will be available during Fiscal Year 1993/94.

**STAFF COMMENTS:**

Staff believes local governments need immediate access to these monies to expand or enhance the state's used oil collection infrastructure. Therefore, staff has expedited development of the Opportunity Grant Program to meet these local needs and avoid an excessive balance in the Used Oil Recycling Fund by the close of this fiscal year. However, statute provides minimal description of the Opportunity Grant Program ("... to provide opportunities for used lubricating oil collection which are in addition to those included in the [block grant program]"). Staff proposes to proceed with the program using the attached application package (Attachment A). Much of this package draws upon basic requirements found in existing and somewhat similar CIWMB grant programs (e.g., Tire Grant and Household Hazardous Waste (HHW) Grant Programs). However, there are several elements that staff would like the Committee to review and approve.

**Application deadline.** Staff proposes establishing an application deadline of March 15, 1994. This deadline presupposes the Committee's ability to consider staff's funding recommendations for the Opportunity Grants during May, 1994. Staff anticipates that applicants not recommended for funding will have an opportunity to appeal at that time.

**Grant duration.** Staff proposes Opportunity Grants will have a two year duration beginning on July 1, 1994, because Opportunity Grant proposals may be more complicated to initiate and administer than the current one year allowed for Block Grants.

**Maximum grant size.** On Page 2 of the attached application package, staff proposes \$250,000 as the maximum possible award. This maximum will guarantee the Board's ability to award at least 20 grants, although staff believes many if not most reasonable proposals will involve less than this amount. Board staff believes a \$250,000 maximum strikes a balance between the goal of funding as many viable projects as possible and providing sufficient funding for the largest types of used oil collection projects.

**Rating criteria.** Staff believes that in addition to evaluating proposals based upon their quality and their merits in relation to other proposals, additional rating priorities should be used. Page 3 of the application package describes the application review process, and listed below is a brief discussion of each of the proposed rating criteria. Staff anticipates applying these criteria cumulatively such that a proposal meeting three of these criteria will receive a higher rating (funding priority) than an equally qualified proposal meeting only one of the criteria.

**1. Establish used oil collection opportunities (e.g., certified centers, curbside collection, drop-off centers).**

Some jurisdictions have expressed their need for grant funds to establish and/or enhance public education programs promoting used oil collection. However, staff interprets the primary intent of the statutory language as establishing actual used oil collection opportunities such as collection centers and curbside collection programs. Staff believes it would be undesirable to completely prohibit use of Opportunity Grant funds for public education because: 1) some jurisdictions have limited access to Block Grant funds due to their small size or inability to achieve Block Grant eligibility requirements, and, 2) some jurisdictions already have well-established collection programs that may need additional public education and/or promotion activities. By giving priority to collection-oriented proposals, grants funds can at least potentially be used for public education purposes while the intent of the statute is met.

**2. Establish new collection opportunities for rural areas, under-served areas, and small cities.**

These areas often have the greatest need for used oil collection opportunities. Staff believes these types of jurisdictions should receive funding priority because they typically only qualified for small quantities of Block Grant funds due to that program's per capita grant formula.

**3. Expand existing collection programs to provide innovative or more cost-effective collection methods.**

Staff believes funding priority should be given to proposals offering innovative and/or cost effective solutions to used oil collection so these solutions can be demonstrated, proven, and ultimately disseminated to other jurisdictions.

**4. Establish collection programs that address regional (multi-jurisdictional) used oil collection needs.**

Many regions of the state may be best served by a regional approach to used oil collection. Staff believes proposals offering regional approaches should receive funding priority, especially in light of the significant challenges often posed by developing and administering regional programs.

**STAFF RECOMMENDATION:**

Staff recommends the Committee approve the attached application package and direct Used Oil Grant Program staff to proceed with the Local Government Used Oil Opportunity Grant Program.

**ATTACHMENTS:**

1. Local Government Used Oil Opportunity Grant application package

Prepared by: Chris Allen *CA* Phone: 255-2136  
Reviewed by: Nguyen Van Hanh *NH* Phone: 255-2437  
Reviewed by: Martha Gildart *MG* Phone: 255-2619  
Reviewed by: Dan Gorfaim *DG* Phone: 255-2319  
Legal review: Bob Conheim *BC* Date/Time: 11/23/93



RECYCLE  
USED OIL

## Local Government Used Oil Opportunity Grants

...

Information and Application Instructions

California Integrated Waste Management Board  
8800 Cal Center Drive  
Sacramento, CA 95826

## SUMMARY

### LOCAL GOVERNMENT USED OIL OPPORTUNITY GRANT PROGRAM

- PURPOSE** The purpose of the Local Government Used Oil Opportunity Grant Program (Opportunity Grant) is to provide grant funding to local governments for providing used oil collection opportunities.
- ELIGIBILITY** Eligible applicants are limited to local governments, which are defined in statute as: "any chartered or general law city, chartered or general law county, or any city and county."
- FUNDING** Program funding is based upon a 4-cent-per-quart fee collected from oil manufacturers on sales of lubricating oil. Funds remaining after recycling incentive payments are made and Used Oil Block Grants are awarded will be used to fund the Opportunity Grants. Board staff anticipates there will be approximately \$5 million available for these grants. Grants will be awarded on a competitive basis with a possible maximum award of \$250,000. Matching funds are not required to obtain an Opportunity Grant.
- ELIGIBLE PROGRAMS** Opportunity Grants are awarded competitively to local governments for proposed programs or expansion of existing programs. Grants awarded during Fiscal Year 1993/94 will provide for an applicant's program expenses incurred beginning in Fiscal Year 1994/95.
- APPLICATION SUBMITTAL** Applicants must submit an original application and three copies to the Board by the filing deadline. The application forms and instructions needed to complete a Local Government Opportunity Grant Application are attached.
- APPLICATION DEADLINE** The Board will accept applications from Wednesday, December 15, 1993 until 4:00 p.m., Tuesday, March 15, 1994. Applications postmarked after March 15, 1994, will be returned to the applicant and will not be considered for grant funding.
- CONTACT** For copies of the application package, call the Board's Grants Hotline at (916) 255-2577. If you have questions or need additional information regarding the grant program, contact Chris Allen at (916) 255-2136, or Darlene Falconer at (916) 255-2657.

DATE	ACTIVITY
December 15, 1993 to March 15, 1994	Application Period
March/April 1994	Staff reviews applications and prepares recommendations
May 1994	Board approves grants
May/June 1994	Standard agreements developed and signed
July 1, 1994	Grant recipients begin execution of grant agreements
June 30, 1996	Completion and closure of grants

\*Please note that this is a tentative schedule.

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# LOCAL GOVERNMENT USED OIL OPPORTUNITY GRANT GRANT YEAR 1993/94

## I. PROGRAM DESCRIPTION

The California Oil Recycling Enhancement Act (Act) (Statutes of 1991, Chapter 817) authorizes the Board to issue grants to enhance the collection and recycling of used lubricating oil. Under the Act, oil manufacturers pay the California Integrated Waste Management Board (Board) four cents for every quart of lubricating oil sold, transferred or imported into California. The Act mandates the Board to use these funds for specified activities that discourage the illegal disposal of used lubricating oil. Public Resources Code §48632(a) specifically authorizes the Board to issue grants to local governments to provide used oil collection opportunities that are in addition to the non-competitive grants provided by the Used Oil Recycling Block Grant Program. This year Board staff anticipates approximately \$5 million will be available for the Local Government Used Oil Opportunity Grant Program (Opportunity Grant). If you have questions or need additional information, contact Chris Allen at (916) 255-2136, or Darlene Falconer at (916) 255-2657.

### ■ APPLICANT ELIGIBILITY

Eligible applicants are limited to local governments, which are defined in Public Resources Code, Section 48617 as: "any chartered or general law city, chartered or general law count, or any city and county." Any city or county, or any group of cities and/or counties (regional programs), may apply for an Opportunity Grant. Commercial businesses or nonprofit groups are not eligible to apply for this grant.

### ■ ELIGIBLE PROGRAMS

Opportunity Grants will be awarded to local governments on a competitive basis for the establishment of new programs or the enhancement of existing programs that address the proper disposal of used lubricating oil. Grant awards will only fund activities begun on or after July 1, 1994. Examples of the types of activities eligible for funding are listed below:

- ⊙ Purchase or retrofitting of vehicles for curbside collection of used oil
- ⊙ Construction or improvement of permanent facilities for the collection of used oil (other hazardous waste may be collected at this site in addition to used oil)
- ⊙ Purchase of equipment and supplies for collection of used oil (i.e., curbside containers, oil collection drums, oil test kits, etc.)
- ⊙ The used oil portion of a mobile HHW collection program
- ⊙ Establishment or expansion of regularly scheduled or on-call curbside collection for used oil
- ⊙ Used oil collection facilities at marinas
- ⊙ Used oil disposal costs
- ⊙ Public education
- ⊙ Expansion of existing used oil collection programs

## ■ INELIGIBLE PROGRAMS:

Those aspects of programs not directly related to the implementation of a used oil collection program are not eligible for a grant. These include but are not limited to the following:

- ⊗ Any portion of a program conducted prior to award of the grant;
- ⊗ Any portion of a program currently funded by a CIWMB loan or grant program;
- ⊗ Cleanup of oil spills on public or private property;
- ⊗ Feasibility or planning studies;
- ⊗ Consultant fees related to feasibility and planning studies;
- ⊗ Programs clearly not cost effective;
- ⊗ Travel expenses not directly related to the implementation of the proposed program;
- ⊗ Equipment, vehicles or other materials that are not primarily used to implement the used oil program;
- ⊗ Staff training classes other than those directly related to the implementation of the proposed program.

## ■ REGIONAL PROGRAMS:

Applicants may find that a joint program with adjacent jurisdictions may be the most effective way to encourage appropriate disposal of used oil. Cities or counties may submit a regional Opportunity Grant application in cooperation with other cities and/or counties to improve the efficiency of a local used oil collection program. Regional programs must designate one jurisdiction or a Joint Powers Authority to act upon the behalf of all participating jurisdictions. Applications for regional programs must include a resolution from the governing body of each participating jurisdiction. The resolution should authorize one jurisdiction as the grant applicant and manager. Applications for regional programs administered by a Joint Powers Authority (JPA) must include a document from each participating jurisdiction indicating they intend to participate in the regional program and that they authorize the JPA to act upon their behalf both as applicant and grant administrator. The Board will direct all official correspondence and grant payments only to the designated applicant.

## ■ GRANT FUNDING

The Board has established a maximum possible award of \$250,000. However, the Board's goal will be to fund as many viable projects as possible. Only costs incurred after July 1, 1994 will be eligible for grant funds. Grant recipients may be awarded only a portion of the funds requested if any part of a proposed program is determined not to be cost effective or if the total funding requested by qualified applicants exceeds the total funds available. Should this occur, Board staff will contact the applicant to determine the portion(s) of the proposed program that would have the highest priority for funding.

The Board will pay grant recipients in arrears with 10 percent being withheld until the grant is completed and the final report submitted. Requests for payment may not be made more frequently than once every quarter. Board staff may approve requests for advance payments based upon justifications offered by the applicant.

## ■ **AUDIT REQUIREMENTS**

This grant is subject to a desk or field audit. Accordingly, the applicant is responsible for maintaining source documents substantiating the expenditures claimed and must make them available at the time of the audit. Records relating to the implemented program include: expenditure ledger, payroll register entries, time sheets, paid warrants, a resolution setting the fringe benefit rate, contracts, change orders, invoices, and cancelled checks. Records must be maintained for a period of three years from the date of final payment by the State.

## **II. APPLICATION PROCESS**

The application process consists of submitting an Opportunity Grant application as described under "Application Instructions" and completing the forms included in the Appendix.

### ■ **APPLICATION DEADLINE**

The application period for Opportunity Grants extends from Wednesday, December 15, 1993 to 4:00 p.m. on Tuesday, March 15, 1994. Applications postmarked after March 15, 1994, will be returned to the applicant and will not be considered for grant funding.

### ■ **APPLICATION REVIEW**

After the close of the application period, Board staff will review and evaluate each application and present its award recommendations to the Board. Grant proposals will be evaluated based upon the information supplied using the application instructions included in this package. Applicants should clearly describe their proposed program and demonstrate their need and ability to conduct the program. Each proposal will be evaluated and assigned a funding priority (ranking) based on the presentation of the proposed program and how it compares to the other grant proposals. In addition, the Board will give priority to proposals that:

1. Establish used oil collection opportunities (e.g., certified centers, curbside collection, drop-off centers);
2. Establish new collection opportunities for rural areas, under-served areas, and small cities;
3. Expand existing collection programs to provide innovative or more cost-effective collection methods;
4. Establish collection programs that address regional (multi-jurisdictional) used oil collection needs.

Board staff will apply these criteria cumulatively such that a proposal meeting three of these criteria will receive a higher rating (funding priority) than an equally qualified proposal meeting only one of the criteria.

## **III. APPLICATION INSTRUCTIONS**

Each applicant must submit the following information for proposed programs to be implemented on or after July 1, 1994. An Opportunity Grant application **must** include an original and three copies of the entire application package. In addition, each application **must**: (1) present information in the order listed below; (2) provide a Table of Contents; and (3) have all pages numbered consecutively on 8½ x 11" paper. All materials submitted will become the property of the Board.

### ■ **APPLICATION COVER SHEET (Exhibit A)**

The Application Cover Sheet includes basic information identifying the project, the applying jurisdiction, and the individuals responsible for program implementation. The required Cover Sheet Form is attached to this document. The person signing this document must be the individual given signature

authority in the jurisdiction's resolution.

- The **Program Director** is the person who has primary responsibility at the local level for the program. "Title" means the official position in the local jurisdiction, e.g., Public Works Director, Solid Waste Management Director, etc.
- The **Finance Officer** is the person responsible for the fiscal management of the program.
- The **Program Manager** is the person responsible for carrying out the project goals and may be the same person as the Program Director.

## ■ PROGRAM REPORT

A used oil collection program report must address each section listed below:

### A. BACKGROUND

The background section should briefly describe the problems posed by used oil disposal within the jurisdiction. This section should also include the jurisdiction's population, a map of the jurisdiction, and describe existing used oil collection opportunities within the jurisdiction. Applicants should incorporate into this section any relevant information from the local HHW Element of its Countywide Integrated Waste Management Plan.

### B. PROGRAM DESCRIPTION

This section should provide a detailed description of the proposed program demonstrating the jurisdiction's need and ability to conduct the program; how it will address the problems identified in the Background section; the geographic area(s) served by the program; and an explanation of the program goals.

- **Operation Plan** - Describe the operation plan(s) for any new or enhanced collection sites, curbside programs, or other collection opportunities. The plan should include frequency of pickup for a curbside collection program; days and hours of operation for a used oil collection center(s); type of equipment or facilities to be used; used oil storage capacity; and method of used oil storage and disposal.
- **Cooperative Efforts** - Describe any cooperative effort(s) with private, nonprofit, government, or other organizations to implement the program.

### C. FUNDING SOURCES

This section should describe any other funding sources that will be used for the proposed program other than those provided by the Opportunity Grant. This section should indicate the local agency funds committed to the program (if any), including the amount, funding sources, any constraints or restrictions on these funds, and the length of funding commitment. Applicants should indicate if other funding, volunteer time, donations, etc. were sought. The narrative should include whether the project can be completed with available and requested funding; and, if not, identify the strategies for obtaining additional funding. The narrative should also indicate the jurisdiction's commitments to continuing the used oil program after Board funding has expired. **Note: Matching funds are not required to obtain a grant.**

## ■ BUDGET REPORT (Exhibit B)

Applicants must complete the Budget Report Form providing specific cost breakdowns by category for CIWMB share and local contribution. The Budget Report Form is divided into five sections: Personnel Services, Overhead, Contracts, Equipment, Materials and Supplies. Following are brief descriptions of the information needed to complete the Budget Report Form:

- **Personnel Services** include salaries, wages, and benefits for wage-earning personnel employed by the jurisdiction who will work directly on the used oil program. Salaries are

calculated by multiplying the number of person-months for each staff member by the appropriate wage. Attach to the Budget Report Form a listing of staff dedicated to the used oil program, including their job classification, hourly wage rate, and estimated number of hours to be billed to the program.

- **Overhead** includes costs for rental/lease of space, utilities, xeroxing, office supplies and other miscellaneous costs incurred in operating a program. Please note overhead can account for no more than 5% of the funds requested.
- **Contracts** - Waste transportation and disposal can include contracts with used oil haulers for transportation and disposal/recycling costs. Other related contracts can include construction and engineering services.
- **Equipment** needed to conduct the used oil program that can be reused. This can include oil storage tanks or drums, retrofitting of vehicles, curbside containers, etc. Enter the total estimated dollar amount on the form and itemize on a separate sheet of paper the items to be purchased, quantity, unit and cost per unit.
- **Materials and Supplies** needed to conduct the used oil program. This can include protective clothing; oil test kits; absorbent material; signs; labels, etc. Enter the total dollar amount on the Budget Report Form and attach an itemized list of items to be purchased indicating quantity, unit and cost per unit.

This report should demonstrate that the budget is realistic for the work proposed and the program will be conducted in the most cost-effective manner. To be competitive, it is recommended that applicants provide copies of bids or estimates and itemize all expenses. Please note that only costs incurred on or after July 1, 1994 will be eligible for grant funding.

#### ■ **APPROVED RESOLUTION (Exhibit C)**

The application package must include an approved resolution from the applicant's governing body authorizing submittal of the application and identifying the title of the individual authorized to execute any agreements, contracts, and requests for payment. Please select the authorized representative carefully because this will be the only person whose signature will be recognized by the Board. Jurisdictions who cannot submit approved resolutions by the March 15, 1994 deadline may submit a signed letter from the city or county manager/administrator indicating an approved resolution will be submitted to the Board before April 27, 1994.

In addition to the applicant's resolution described above, applications for regional programs must include resolutions from the governing bodies of all other participating jurisdictions. These resolutions should authorize the applicant to act upon the behalf of the jurisdiction both as applicant and grant administrator. Applications for regional programs administered by a Joint Powers Authority (JPA) must include a document from each participating jurisdiction indicating they intend to participate in the regional program and that they authorize the JPA to act upon their behalf both as applicant and grant administrator. Examples of documents might include a signed letter from the jurisdiction's chief administrative officer or a resolution from the jurisdiction's governing body. The Board will direct all official correspondence and grant payments **only** to the designated applicant.

#### ■ **WORK STATEMENT (Exhibit D)**

The Work Statement lists all tasks necessary to accomplish the proposed program. List and describe the proposed major tasks to be undertaken and the products that will result from those tasks. For each task, identify the budget allocation and whether the budget allocation will come from CIWMB funds and/or local funds; the entity performing the task (staff or contractor); the products or results; and the time required to accomplish each task.

The Work Statement should also list all subtasks needed to complete each major task. For example, if

the proposed program involves hiring a hauler to transport and dispose of the program's used oil, the Work Statement might list the following subtasks: 1) preparation of a request for proposal or bid; 2) in-house review process; 3) proposal/bid sent to businesses; 4) preparation of contract; 5) announce award of contract. This form may be adapted to each jurisdiction's computer software program but the format must be followed as provided on the form attached to this document.

In the event the Board awards only a portion of an applicant's grant request, Board staff will incorporate any additional grant conditions or changes in the final grant agreement (contract). Board staff will also add requirements needed to expand, clarify, and further define tasks in order to accurately reflect the revised project. Any such changes will be made in consultation with applicants whose grant requests have received Board approval.

#### ■ **PROGRAM TIMELINE (Exhibit E)**

The Program Timeline is a representation of the estimated time needed to complete the tasks and products listed in the Work Statement. The Program Timeline should include:

- A list of major tasks to be accomplished, entered by number and title from the Work Statement Form;
- The estimated person-hours required for each task;
- The duration of the task entered as a bar extending across the chart corresponding to the months needed for completion.

In preparing the Program Timeline some tasks may overlap, depending upon the nature of the project. The total person-hours figure will be used in calculating the proposed Personnel Services and forwarded to the Budget Form (Exhibit B). Draw a line next to the task number on the Program Timeline Form to indicate the months in which the activity will be conducted. This form may be adapted to each jurisdiction's computer software program but the format must be followed as provided.

#### **IV. APPLICATION SUBMITTAL**

Applicants must submit an **original and three copies** of the application to the Board's principal place of business by 4:00 p.m. of Tuesday, March 15, 1994. Applications postmarked after this date will be returned to the applicant and will not be considered for grant funding. Please submit application to:

California Integrated Waste Management Board  
Markets, Research, and Technology Division  
Used Oil Grant Program  
8800 Cal Center Drive  
Sacramento, CA 95826

For Agency Use Only

File # \_\_\_\_\_

State of California

California Integrated Waste Management Board

**APPLICATION COVER SHEET  
LOCAL GOVERNMENT USED OIL OPPORTUNITY GRANT**

CIWMB-306 (9/92)

Name of Applicant: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_

Zip: \_\_\_\_\_

Name of Program Director: \_\_\_\_\_

Title: \_\_\_\_\_

Phone: \_\_\_\_\_

Name of Finance Officer: \_\_\_\_\_

Title: \_\_\_\_\_

Phone: \_\_\_\_\_

Name of Program Manager: \_\_\_\_\_

Title: \_\_\_\_\_

Phone: \_\_\_\_\_

Program Description: \_\_\_\_\_

Total Grant Request: \_\_\_\_\_

**Certification:**

I declare, under penalty of perjury, that all information submitted for the Board's consideration for allocation of grants funds is true and accurate to the best of my knowledge and belief.

Name of Person Authorized by Resolution: \_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Title: \_\_\_\_\_ Phone: \_\_\_\_\_

# BUDGET REPORT

## LOCAL GOVERNMENT USED OIL OPPORTUNITY GRANT

Grant Applicant \_\_\_\_\_

Date \_\_\_\_\_

Proposed Program \_\_\_\_\_

	CIWMB FUNDS	LOCAL <sup>1</sup> CONTRIBUTION
<b>PERSONNEL EXPENSES</b>		
Salaries and Wages	_____	_____
Fringe Benefits <sup>2</sup> @ _____ %	_____	_____
TOTAL PERSONNEL SERVICES	_____	_____
<b>TOTAL OVERHEAD<sup>3</sup></b>	_____	_____
<b>CONTRACTS<sup>4</sup></b>		
Transportation & Disposal	_____	_____
On-site services	_____	_____
Other	_____	_____
TOTAL CONTRACTS	_____	_____
<b>TOTAL EQUIPMENT</b>	_____	_____
<b>TOTAL MATERIALS &amp; SUPPLIES</b>	_____	_____
<b>TOTAL OTHER COSTS</b>	_____	_____
<b>TOTAL BUDGET</b>	_____	_____

**All expenses listed above must be itemized on a separate sheet of paper**

<sup>1</sup> Matching funds not required.

<sup>2</sup> Resolution setting fringe benefit rate must be available for audit purposes for three years following final grant payment.

<sup>3</sup> Overhead not to exceed 5% of total funds requested.

<sup>4</sup> Include copies of estimates or bids with grant application.

**RESOLUTION AUTHORIZING LOCAL GOVERNMENT  
USED OIL OPPORTUNITY GRANT APPLICATION**

**(Sample - Please Retype)**

WHEREAS, the people of the State of California have enacted the California Oil Recycling Enhancement Act that provides funds to cities and counties for establishing and maintaining local used oil collection programs that encourage recycling or appropriate disposal of used oil; and

WHEREAS, the California Integrated Waste Management Board has been delegated the responsibility for the administration of the program within the state, setting up necessary procedures governing application by cities and counties under the program; and

WHEREAS, said procedures established by the California Integrated Waste Management Board require the applicant to certify by resolution the approval of application before submission of said application to the state; and

WHEREAS, the applicant will enter into an agreement with the State of California for development of the project;

NOW, THEREFORE, BE IT RESOLVED that the \_\_\_\_\_ *(Title of Governing Body)* authorizes the submittal of an application to the California Integrates Waste Management Board for a Local Government Used Oil Opportunity Grant. The \_\_\_\_\_ *(Title of Official)* of the \_\_\_\_\_ *(Name of Jurisdiction)* is hereby authorized and empowered to execute in the name of the \_\_\_\_\_ *(Name of Jurisdiction)* all necessary applications, contracts, agreements and amendments hereto for the purposes of securing grant funds and to implement and carry out the purposes specified in the grant application.

The foregoing resolution was passed by the \_\_\_\_\_ *(Title of Governing Body)* this \_\_\_\_\_ day of \_\_\_\_\_, 19\_\_\_\_. Effective \_\_\_\_\_, 19\_\_\_\_.

ATTEST:

Signed: \_\_\_\_\_  
*(Name and Title of Official Authorized to Sign)*

Date: \_\_\_\_\_

**WORK STATEMENT  
LOCAL GOVERNMENT USED OIL OPPORTUNITY GRANT**

Grant Applicant \_\_\_\_\_

Date \_\_\_\_\_

Proposed Program \_\_\_\_\_

Task No.	Description of Task	Budget CIWMB/Local	Product or Results	Staff or Contractor	Time Required

# **PROGRAM TIMELINE** **LOCAL GOVERNMENT USED OIL OPPORTUNITY GRANT**

Grant Applicant \_\_\_\_\_

Date \_\_\_\_\_

Proposed Program \_\_\_\_\_

Task No.	JULY 1994	AUG 1994	SEPT 1994	OCT 1994	NOV 1994	DEC 1994	JAN 1995	FEB 1995	MAR 1995	APR 1995	MAY 1995	JUNE 1995	JULY 1995	AUG 1995	SEPT 1995	OCT 1995	NOV 1995	DEC 1995	JAN 1996	FEB 1996	MAR 1996	APR 1996	MAY 1996	JUN 1996
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\*Draw a line for each Task No. through the months during which that activity will occur. Task Nos. should coincide with those on the Work Statement Form.

CALIFORNIA INTEGRATED WASTE MANAGEMENT BOARD

LOCAL ASSISTANCE AND PLANNING COMMITTEE

December 9, 1993

Agenda Item 10

**ITEM:** Consideration of Use of Waste-Derived Material for Alternative Daily Cover (ADC) as it Pertains to Diversion Mandates and Waste Management Planning Regulations.

**BACKGROUND:**

In 1990, the Board adopted "Procedural Guidance for the Evaluation of Alternative Daily Covers". The procedure requires that a landfill operator submit a request for consideration which includes an evaluation justifying the proposed use of an alternative cover. Once the operator receives approval from the CIWMB on the merits of the proposal, a year long demonstration project is conducted to evaluate the proposed material's suitability as daily cover. If the demonstration project is successful, the solid waste facilities permit is revised to include the proposed material as ADC on a non-experimental basis.

On May 5, 1993, the Policy, Research and Technical Assistance (PRTA) Committee considered Agenda Item #1, "Consideration Of Quantification and Fee Assessment For Materials Used As Alternative Daily Cover." This agenda item presented three options, Options A, B, and C, for the Committee's consideration on whether materials approved as alternative daily cover (ADC) on a non-experimental basis should be assessed the State landfill surcharge and quantified as a disposal or diversion activity.

Option A allows any approved ADC material which is normally disposed of to contribute to disposal reduction and specifies that approved ADC is not subject to the State disposal surcharge. Landfills would still be able to charge local fees for ADC materials coming into the facility. The Policy Committee characterized this as the least restrictive of the three options.

At the May 5, 1993 PRTA Committee meeting, the Committee passed a motion adopting Option A "with directives to staff to perform additional study on methods for the use of waste material as alternative daily cover, and make any recommendations regarding modifications of Option A that might be necessary." Staff was also directed to determine if regulations were necessary to implement Option A. Additionally, the motion was amended with the intent of providing "incentives and encouragement" for the use of "waste material" as ADC and "discourage the use of non-waste material" as ADC.

In response to this directive, staff prepared for the PRTA Committee meeting of July 7, 1993 an agenda item that identified several broad issue areas relating to the use of waste derived ADC. One of the issues raised was the use of ADC towards meeting the diversion mandates of the Integrated Waste Management Act of 1989 (IWMA) and how this may affect the development of regulations resulting from AB 2494. Another issue raised was whether IWMA fees should be collected from waste disposal facilities for the use of materials that enter the facility for use as ADC.

Because the issue of use of waste derived ADC to meet diversion mandates affects the IWMA planning process, the Board's Local Assistance and Planning Committee (Planning Committee) requested staff to analyze the effects of Option A and other potential options on several planning and marketing issues. These issues include how the use of ADC will affect jurisdictions meeting the diversion mandates; the regulations needed to implement AB 2494 (mostly to materials quantification); alternate markets for materials proposed for use as ADC; and local governments, landfill operators and other businesses such as composters. Another issue addressed is whether the use of ADC is considered diversion or should be counted as disposed when determining compliance with the IWMA mandates.

Staff of the Office of Local Assistance and the Plan Implementation Branch presented their analysis at the September 7, 1993 Planning Committee meeting. The Planning Committee directed staff to circulate staff's analysis for a public comment period and to report back at the November 2, 1993 Planning Committee.

At the November 2, 1993 Planning Committee, staff presented the summary of the comments received during the comment period. Additional public testimony was presented to the Committee at that meeting. Staff have since been directed to bring back the item for Committee consideration at the December 7 Planning Committee meeting.

#### ANALYSIS:

The Planning Committee received additional testimony at the November 2, 1993 meeting. The speakers included elected officials and staff from local jurisdictions throughout the state, and representatives of the waste management industry, composting industry, bio-mass industry, and other interested parties.

The speakers supporting the use of ADC to count as disposal reduction highlighted the importance of a good stable alternative marketplace for green waste: it saves daily disposal capacity, it encourages separate collection of green waste and provides a much needed infrastructure for green waste diversion and reuse. Speakers opposing the use of ADC as disposal reduction stated the policy may have negative impacts on the composting or biomass industries and questioned the hierarchy issue whether allowing ADC as disposal reduction contradicts AB 939. The speakers that supported the use of ADC with conditions focused on limiting the amount of ADC for disposal reduction and applying conditions.

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Date/Time: 11/24/93 9:00am.